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Patterns of Change in Prosodic Systems

By

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Patterns of Change in Prosodic Systems

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Abstract

The study of possible causes and directions of the diachronic change of prosodic features (stress, pitch, tone, etc.) has lagged behind the investigation of their synchronic status and formalization. This dissertation presents a basic outline of prosodic change in terms of the frameworks developed by the theories of metrical and autosegmental phonology.

The fundamental issue in this work is the question of accounting for typological shifts in prosodic features of languages. I present a definition of a prosodic system, a typology of such systems, and a summary of basic metrical and autosegmental theory. Special attention is paid to the metrical foot as a basic unit of prosodic organization. I suggest that most types of such change involve the reanalysis by speakers of the relationship between various subsections of the prosodic phonology: tonal elements, metrical prominence, the domain of prosodic rules, etc. Several principles of prosodic change are laid out in the course of the discussion, dealing with loss rule iteration, prosodic fossils, and directionality of change.

Chapters are dedicated to case studies in prosodic change, including: issues of accent and syncope in Italic; stress, pitch, and metrical structure in the Wakashan lan-

guages of the Pacific Northwest; and questions in comparative Indo-European metrical systems, especially Vedic, Greek, and Slavic. Shorter examples discuss metrical feet and accent in Japanese, "mirror-image" stress rules in Celtic and metrical rules in Bantu.

Sary B. Holland

Signature of Chair

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Chapter One: Introduction and Background

1.1 Purposes of the Current Study

In the vast field of historical linguistics, and even in the much narrower literature dealing with historical phonology, the study of the systematic change of prosodic features has been the subject of relatively little attention. There has, of course, been considerable discussion of specific accentual and quantitative correspondences between sister languages and dialects, especially within the Indo-European family. But with the one happy exception of the sources and phonetic processes underlying tonogenesis, major typological shifts in accentual and rhythmic systems have largely been set aside in historical descriptions and comparative grammars.

It is clear that there is a significant difference between the relatively common use of features such as stress and syllable weight in historical explanation (Verner's Law being only the most obvious example), and a systematic account of prosodic change. Even Verner did not ask how and why Germanic had lost the earlier type of accent which he had posited to such good result.

This thesis is an attempt to address some of the questions raised by the issue of prosodic change, and to evaluate the effectiveness of two current phonological theories as models for diachronic processes. These theories, metrical and autosegmental phonology, have enjoyed a good measure of interest and debate when applied to

synchronic problems, but heretofore their relevance to historical questions has remained untested. I will attempt to show the strengths and weaknesses demonstrated by both models when applied to such issues.

To jump to the conclusion, it appears from the case studies presented here that both theoretical approaches do capture some important types of prosodic changes in interesting ways, though neither is completely adequate for explaining the wide range of processes encountered. At the same time, the introduction of diachronic data into the realm of theory-building leads to some significant questions regarding certain aspects of the models themselves.

A brief outline of the presentation would be in order. Chapter Two is in many ways the heart of the current discussion. In it, a definition and examination of what I will term the "prosodic system" of a language is presented, along with a typology of attested prosodic systems. I then review the basic ideas of metrical and autosegmental theories of phonological organization, along with some special considerations of the predictions each theory makes about prosodic change. The example of Passamaquoddy vowel processes and stress assignment is used to demonstrate some of the ideas presented.

The next three chapters are case studies of interesting examples of prosodic change. Chapter Three is a look at syncope, vowel reduction and stress in some of the members of the Italic branch of Indo-European, especially Latin,

Oscan and Umbrian, followed by a brief discussion of other Indo-European accentual systems for comparative purposes. Chapter Four is a discussion of the accentual rules found in the Wakashan languages of British Columbia and Washington State. This family includes a wide range of prosodic features, and the differences in the stress rules between the two main subgroups of the family can be described profitably through the use of metrical models. Chapter Five discusses a number of types of prosodic change in Slavic, including the treatment of reduced vowels and the evolution of pitch-accent, free stress and fixed stress systems in the modern languages.

Chapter Six includes several brief surveys of prosodic change in a number of other language families, including Bantu, Japanese, and Celtic. It also serves as the summary and conclusion for the paper as a whole.

The remainder of this chapter comprises a brief review of the discussion of prosodic change in the literature, as well as some comments on the "theoretical" orientation of the current work.

1.2 The Study of Prosodic Change

The term "prosodic" is open to a wide variety of interpretations, and will require definition for the purposes of this study. While a fuller discussion of the uses of the term prosodic can be found in Chapter Two, let us for the moment use the somewhat inadequate definition of "referring to the full set of suprasegmental features of a

language." This would include such elements as tone, pitch accent, intensive stress, intonational melodies, and so on. It might also include, for certain languages, patterns of glottalization, nasalization, or pharyngealization which are added to segments in certain contexts, or any such features with a broad domain of application.¹

With this definition in mind, we can begin our search for discussions in the literature dealing with the historical change of such features. We quickly find, however, that such questions are almost never dealt with directly, but are simply described in the larger context of segmental change. In Buck's Comparative Grammar of Greek and Latin (1933), for example, we find a careful discussion of the vowel systems of both languages, with many references and reconstructions back to Indo-European. Indeed, the accentual systems of Greek and Latin individually are well described. But while some features of the Greek accentual system is connected through comparison to Indo-European, and certain questions regarding the internal history of the Latin accent are raised, discussion of the path of development from IE to either language, or the possibility of even distant rela-

¹Syllable weight and vowel length, while certainly part of the overall prosodic system, will be treated as part of a distinct subclass of prosodic features in the current study. See the full discussion of their status in Chapter Two.

tionship between the two systems is totally absent.²

In the same way, Brugmann (1897), Meillet (1907), and Hirt (1929), while making important strides in the description of the older accentual systems, never address the larger question of the change of such systems directly. Time and again, one encounters a statement such as, "At a later period this earlier accent was replaced by the modern system...", with no analysis of what such a change would involve. Meillet (1907:141) uses a modern example of the retention of the place of accent even when the nature of the accent has changed to make an analogy to the reconstruction of the accent of Indo-European subgroups:

De même que l'accent [i.e., the stress accent] du grec moderne occupe en principe la place du ton grec ancien, l'accent du lithuanien, du russe, du serbe, etc. occupe encore la place du ton que possédaient le baltique commun et le slave commun.

but nothing comes of this observation regarding patterns of accentual change. The focus of such studies is always on the reconstruction of accent in individual lexemes or, at most, paradigms or nominal classes.

One of the most interesting examples of this type of accentual description comes from Hirt (1931), in which he discusses the change in accent found in the history of Germanic. After pointing out the major shift which has occurred from an Indo-European style free accent to the

²Though Buck is, I believe, ahead of his time in his discussion of the phonetic realization of Latin accent and the possible existence of stress in Classical Greek (1933:162, 165-167).

fixed initial accent found in the majority of the modern Germanic languages, Hirt attempts to reconcile the two systems (p. 144):

Jedenfalls ist es nicht zu leugnen, dass das Germanische gegenüber dem Idg. seine Akzentuierung geändert hat. Man folgert daraus, dass die Germanen keine echten Indogermanen gewesen, sondern indogermanisiert worden seien, d. h., ein Volk mit expiratorischem Akzent habe Idg. gelernt und dabei seinen alten Akzent beibehalten. So wenig mir dieser Gedanke zusagt, so wenig kann ich mich der Annahme entziehen, dass wirklich etwas Derartiges vor sich gegangen ist. Es ist aber zu beachten, dass die Akzentuierung des Idg. selbst, wie wir an der Wirkung des Akzentes sehen können, gewechselt hat...und dass das älteste...ein expiratorischer Akzent gewesen ist, der dem germanischen genau entsprach.

The options which Hirt sees before him, then, are to deny the true Indo-European origins of the Germanic peoples, or to assume the evolution of Germanic accent from a very early stage of IE accent. His comments about the former show how little confidence he could place on the latter (which would appear to be by far the more likely case, though see Salmons (1988) for further study of the origin of initial accent). This, I believe, shows how little the question of typological change in accentuation was even considered a possibility.

Why, then, at a time when prosodic (or at least accentual) features were being compared and reconstructed, was so little being said about prosodic change itself? It would appear that were three main reasons for the lack of direct analysis by the earliest group of Western researchers. First, changes in prosodic features was apparently

viewed as been purely reactive in nature, conditioned by the nature of the segmental string. Thus, the real job of reconstruction was the establishment of segmental correspondences and morphological (and later syntactic) parallels; if the cake were found, the frosting would come for free.

Second, the Neogrammarian approach to the comparative method is not well suited for dealing with accentual change, at least not when approaching major typological developments. If the question before us is, for example, an unaccountable accent on a given set of words in Greek or Sanskrit, we are able to employ the same rules of internal reconstruction that would aid us with non-prosodic irregularities. We can examine the data for such motivations as paradigmatic levelling, or some other type of analogy, or perhaps some type of dissimilation for morphological or semantic reasons. We may also look for purely phonetic conditioning factors, such as a regular tendency to shift accent away from high vowels, or some sort of assimilation.

If, on the other hand, we ask how Greek came to lose its pitch accent in favor of the stress found in Modern Greek, or how Old Irish came to have initial accent while Welsh shows penultimate accent, or how Japanese evolved from what looks like a restricted tone system in the Old Kyoto dialect to the modern pitch accent system, the comparative method does not have much to offer. These larger types of shifts involve issues that are harder to categorize into Neogrammarian regularities.

Third, phonology has not had the tools to discuss prosodic systems as systems. There has been no equivalent elements to distinctive features when examining prosodic systems, no set of primes to use for comparison and analysis.³ This lack of a framework for the description of prosodic patterns has made the discussion of changes in such patterns difficult. It is to the credit of researchers such as Kurylowicz and, later, Kiparsky and Garde, that they were able to set up working models of prosodies to enable them to discuss change in a meaningful way. Still, prosodic phonology remains undeveloped in comparison to segmental analysis, though the recent development of the metrical and autosegmental models have changed this somewhat.

It is for this reason that the older approaches to prosodic features, which deal almost exclusively with accent, are not adequate for our purposes. The classical tradition, of course, largely took the existence of accent for granted, and spent its time detailing the rules (or, more often, simply the crucial examples) for its exact placement. The more specific discussions of prosody, especially within the Greek tradition (from which the Latin is largely derived) are valuable, but have contributed surprisingly little to our

³Of course, prosodic features have been translated into distinctive features of the type [\pm stress] or [itone], etc. But these are features of vowels or syllables, not features of the prosodic elements themselves.

more general descriptive approach to the subject.⁴

Within the more modern works, we find a wide variety of approaches to the notation and description of suprasegmental elements. While the specifics of notational systems may seem trivial to the discussion at hand, such usage often mirrors assumptions about the phenomena at hand; a short review is thus in order. In general, these can be divided into six major types:

1) Traditional accentuation marks: these have been used for all types of prosodic features. In addition to the inherited acute, grave, and circumflex accents, the description of tonal languages required the recognition of a middle accent, usually marked by a horizontal line (Pike 1948). This remains by far the most common notational system, and will be used in a number of cases in this study. Care must be taken to clearly distinguish whether such accents represent stress or tone features. Even within the description of tonal systems, the Classical heritage of this system has often resulted in an unmarked "default" value (minimum stress or low pitch) rather than a mark on each vowel.

2) Numbers: widely used in the description of tone within the Americanist tradition, integers have also been

⁴Aside from the terminology, we have not preserved much of the Greek theory of prosody outside of Classical scholarship. This is our loss, as many of these grammarians make quite interesting comments pointing to a greater degree of suprasegmental complexity within spoken Greek than is usually admitted. See the quotes from Dionysius of Halicarnassus and Aristoxenus in Allen (1987), for example, and our discussion in Chapters Three and Four.

employed for both phrasal intonation (Bolinger 1978) and stress, especially when dealing with stress subordination. In older works, they also are used to indicate "downstep" and "downdrift" in tonal systems. Perhaps their most common application has been the description of Chinese tone and tone sandhi.

3) Distinctive features: the development of theories of distinctive features for segmental phonology within the Prague school, and their continuation within generative phonology, led to the description of suprasegmentals along the same line. Such features were designed either as binary ([+/-stress], [+high]) or as multivalued ([N stress]).⁵ This allowed such qualities to be added, deleted, or altered using the same rule notation employed for segmental processes. The limitations of this notation became apparent within the generative literature when its use went beyond individual rules (Chomsky and Halle 1968).

4) Contour lines: the description of intonation and pitch melodies through the use of a continuous line going above and below the segmental string emphasizes the non-discrete nature of prosodic elements, but has had limited application. Its primary drawback is its restriction to a high-low opposition, since any other values would intersect

⁵This usage often paralleled the description of vowel height as either a combination of binary features or a single multivalued feature, though the SPE framework itself does not do this.

the segmental line. It has had some success within Japanese studies.

5) Tone letters: widely used within Africanist work, the use of H, L, M, and, to a more limited extent, R and F to mark respectively high, low, mid, rising and falling pitch has made the description of tonal systems more efficient. One drawback has been the use of single markers for the contour tones, which often are resolved into or result from single tones. Autosegmental phonology has continued the use of H and L, while showing contours as combinations of atomic tonal elements.

6) Musical notation: while the staff-and-note system of musical transcription is often useful in the close phonetic description of various suprasegmental units, it is too bulky and often overly specific for general phonological use. A special application has been in the description of the treatment of spoken tonal elements in the context of singing.

These six systems primarily differ in regards to their exhaustiveness and degree of detail. Numerical and musical notation often displays many redundant features, and usually can be transcribed using one of the less detailed systems without the loss of phonologically distinctive information. In this study, we will make use primarily of traditional accentual marks for the notation of surface prosody, while underlying features will be marked using the standard conventions of autosegmental and metrical work.

It is the abstractness and generality of these two

latter models that make them particularly useful in diachronic studies, especially when dealing with major typological shifts within prosodic systems. On a purely notational level, the older systems often allow no easy way to discuss the evolution of pitch accent to stress, or tone to pitch accent, since they would employ different marks for such systems. While a similar problem arises between metrical and autosegmental models, it is much less problematic.

When we go beyond notation to actual models of prosody, we encounter similar differences in assumptions, applicability, and diachronic usefulness. The following sketch is far from exhaustive, but will give an idea of the overall evolution of our notions of prosodic features.

Because of the limited data presented by the Classical and modern European languages, the earliest linguistic studies were focussed almost exclusively on the nature of lexical accent. The major distinction worked out by the nineteenth and early twentieth century scholars was that between pitch accent and stress accent. Brugmann (1897) discusses the difference between the "tonal" or "musical" accents found in Ancient Greek, Lithuanian and Vedic Sanskrit, and the stresses of Latin, Germanic, and Celtic. As Beckman (1986) points out, this distinction was based almost entirely on the basic phonetic distinction of the realization of accent, and did not include any further discussion of the possible differences between the two systems (see 2.2.4 for such features). Of course, a number of scholars realized that these types of

accent were not mutually exclusive, and suggested that a language might have both types of systems (Buck (1933) for Latin, Brugmann (op. cit.) and Meillet (1907) for Indo-European).

Stress was associated primarily with loudness or amplitude, which in turn was connected to the pulmonic force associated with a given vowel. Sweet (1906) defines stress as "the comparative force with which the syllables that make up a longer group are uttered", with 'force' here being "the effort by which breath is expelled from the lungs". It should be noted that Sweet defines stress not as a feature of a single syllable, but as the "comparative force" of each syllable in an utterance. Passy (1906) makes use of similar definitions, and further makes an interesting observation concerning the lexical accent:

Quant a la force relative des diverses parties d'un groupe, il est facile de distinguer des syllabes fortes, moyennes et faibles....On dit souvent que la syllabe forte est accentuee ou porte l'accent de force; que les autres sont des syllabes inaccentuees ou atones.

It should be noted that, even though Passy draws a three-way distinction of levels of acoustic stress, there remains only one syllable worthy of the label "accented"; all others, whether moyennes or faibles, are collectively inaccentuees. That there is no specific consideration of secondary stress as such is perhaps due to the classical tradition.

While familiar with "tone" languages, such as Chinese and Vietnamese, scholars of this period made no clear dis-

inction between such systems and the pitch-accents found in Lithuanian or Swedish. Sweet defines a tone language as one "in which voice-pitches are used for the purpose of distinguishing words", a description covering a wide range of pitch-based prosodies.⁶ This two-way typology soon proved inadequate.

The concentration on accentual types carried over into diachronic studies as well, which focussed on observed accentual shifts. Saussure (1894) showed that the number of observed accentual "curves" (paradigmatic patterns) in Lithuanian could be reduced by positing an historical accent shift in predictable environments (Illich-Svitych 1979). Wheeler and others performed similar studies on the history of Greek accentuation using both internal reconstruction and comparison with the Vedic evidence.

As the range of linguistic data increased, it became clear that a more specific deliniation of the uses of pitch was necessary. Sapir (1921:79-81) gives a brief but insightful comparison of various systems of accent, making a clear distinction between stress and pitch. He also makes, perhaps for the first time, the distinction between those systems that use pitch to reinforce grammatical features already

⁶ His definition of a stress language is parallel: a language "in which meaning depends in any degree upon types of stress or upon the location of strong stresses in sequences of syllables". Such a definition appears to ignore the large number of predictable stress systems attested, even including the emphatic and focussing uses of stress which Sweet includes in his definition.

marked segmentally, and those which employ pitches as meaningful elements in and of themselves:

The mere fact, however, that pitch variations are phonemically essential to the language, as in Chinese...or as in classical Greek...does not necessarily constitute a functional, or perhaps we had better say grammatical, use of pitch. In such cases the pitch is merely inherent in the radical element or affix, as any vowel or consonant might be. It is different with such Chinese alternations as chung (level) "middle" and chung (falling) "to hit in the middle"...All in all it is clear that pitch accent, like stress...is far less infrequently employed as a grammatical process than our habits of speech would prepare us to believe probable.

While a distinction between pitch accent and tone as such is still missing from Sapir's discussion, he has made a much more subtle and perhaps more crucial observation. His division is between a tonal feature carried by a morpheme⁷ and a tonal element making unique distinctions of its own. This difference will be discussed more fully in the next section.

The idea of pitch as a separate grammatical element reached its fullest form within structuralist theory, both in its American and Prague School versions. Suprasegmentals were seen more and more as additional phonemes to be added to the inventory. Their special status received comment (Wells 1945 has a clear discussion), but interest was largely focussed on their distributional irregularities. In some of

⁷ Since Sapir mentions Greek here, it is unfortunate that we do not have a fuller discussion of his understanding of the accentual system of that language. Suffice it to say that Greek shows the same division between "grammatical" and "non-grammatical" pitch as Chinese.

the grammars of this period, there is an alternative approach: seeing accented and unaccented vowels as different phonemes (Halpern 1946 on Yuma is a good example).

The most important work on examining the possible range of prosodic systems done at this time was Pike's Tone Languages (1948), which established many of the conventions still used to discuss tonal patterns. Pike established the first set of universals of tone systems (two to four pitch distinctions, a hierarchy of tone-bearing units, etc.), still leaving a good amount of overlap between tone and pitch-accent. Pike's style of analysis was continued and expanded by a number of researchers, including Bloch (1950) and Martin (1952) in their work on Japanese.

At the same time, a different approach was being taken by several phonologists who were attempting to capture some of the general characteristics of prosodic systems within a basically structuralist model. In America, Zelig Harris (1945) argued that phenomena such as vowel harmony, assimilation, and pitch contours could best be explained by the spread of phonological elements across a given domain. Phonemes capable of spreading were identified with "long components", broken down into Prague-style distinctive features. So, in a language such as Turkish, the vocalic features [+round] and [+back] would be allowed to spread from the initial syllable of a word forward through all of the suffixes, causing agreement in all following vowels. Low vowels in suffixes act as "junctures" (parallel to the

suprasegmental junctures used to explain Japanese pitch patterns: see Martin (1967)), blocking further spread of [+round], while [+back] continues to spread. An example of such long components would then be

Rd----	Rd-
Bk----	Bk-----
jollmIz	jollArImIz

where the capital letters are "underspecified" (the term was not yet used) vowels marked underlyingly only for height. The rest of the features are filled in by the long component. If a vowel does not receive roundness or backness, either because such a long component is not present in the root vowel or because its spread is blocked by a suffixal low vowel, it is automatically assigned a negative value for that feature.

At about the same time, J.R. Firth was presenting a similar model in England. Called prosodic phonology, this theory argued that all features which could be instantiated over more than one segment should be viewed as prosodic elements.⁸ All such features were inherently eligible for the kind of spread seen in Harris' long components. Nasalization and voicing, which trigger assimilation in a large number of languages and environments, are prime examples of features with prosodic status. Even dissimilation was seen

⁸This claim forms the basis of the feature of extension, which I consider obligatory for prosodic features; see the theoretical section of Chapter Two. This study suggests other conditions on prosodic features which would be more restrictive than Firth's ideas.

as prosodic, since it implied that some feature was able to affect a discontinuous string of segments (see, e.g. Allen (1951) for a statement of Grassman's Law within a prosodic phonology framework).

In many ways, Firth went beyond even this broad understanding of "prosodic", eventually using the term interchangeably with "governed by rule" (Langendoen 1968). Thus, any effect on a segment by another segment, or even by a multisegment "context" (identical to generative grammar's "structural description") would be understood as prosodic. One wonders if, at this point, the term is still sufficiently definable as to be of use.

One contribution by Firth and his students at the London School which will play a large part in the presentation of this study is the separation of the idea of phonological prominence from the specific marker of that prominence (usually stress or pitch). Thus, in speaking about the prosodies of Egyptian Arabic, he discusses the placement of stress by saying

In...words the prominent [position] is marked by an accent. This is, however, not necessary, since prominence can be stated in rules without exception, given the...analysis of syllabic structure. (1948:129)

Here Firth somewhat surprisingly dismisses the accent itself as "not necessary", since the structural rules of Arabic phonology have already established regular prominence by rule. We will see how this idea can lead to a theory which can help to explain diachronic changes between different types of prosodic systems.

What Harris and Firth both advocated was to view of phonological processes as being able to operate on different levels simultaneously, where level may refer both to the domain of the process and the type of element with which it is concerned. Such a multi-tiered approach involved a good amount of notational complexity, a problem which has recently plagued the most direct descendents of such work, metrical and (especially) autosegmental theories. It is ironic, in fact, to hear the constant claim that these two theories are "an outgrowth of classical generative phonology"; to the outsider, they appear much more a rejection of many of the formal ideas of generative phonology and a return to the earlier insights mentioned above.⁹

This genealogical question is of some interest, since the earliest versions of generative phonology, as summarized and capped by The Sound Pattern of English (1968), involved a number of missteps in the description and analysis of prosodic elements. Primary among these was the rejection of the syllable as a basic unit of phonological organization, as is still seen in works such as Halle and Vergnaud (1987). Syllable weight was assumed to be replaceable by an appeal to a certain sequence of C's and V's, but this was exactly the wrong approach. As we will see, much of the special nature

⁹Of course, the theoretical orientation of most of the scholars involved in early work on the two theories when dealing with larger issues of grammar would appear to be clearly generative.

of stress accent is tied to the internal organization of the syllable as a prosodic domain, a structure which cannot be identified without the syllable as a standard unit of organization. Kahn (1980) is generally credited with the resurrection of the syllable within the mainstream generative literature.

A second problem with SPE-style work involves the nature of prosodic features. Chomsky and Halle treat stress as a multivalued feature assigned by a set of bracketed rules, with each reapplication of the rule(s) subordinating previously assigned stresses by regular convention. This statement fails to capture the organizational properties of stress, which should, it seems, be reflected by the notion of a "stress structure", that is, a hierarchical framework which assigns prominence relationships directly, rather than a set of iterative rules. Indeed, the great problem with the SPE model of prosody is its rule-governed rather than structure-governed orientation.

More recently, direct work has been done by a number of scholars to address diachronic change in prosodic features directly and systematically. Garde's work on Slavic accentuation (1976), and Kiparsky's application of similar ideas to Indo-European (with Morris Halle 1979) and Vedic (1982), has broken new ground in the discussion of the very accentual systems which began this review, and deserve some further explication and comment.

Previous work on Indo-European accent, and those systems

such as Vedic and Russian which have maintained the freedom of that accent (if not its placement), has often looked at accent assignment at the paradigmatic level. A given nominal paradigm, for example, would show accent on the same syllable in every form; another would have mobile accent, with the accent shifting in a regular pattern between root, stem vowel, and suffix. In derived words, the final placement of accent would be stated in terms of a certain suffix, so in Whitney's *Sanskrit Grammar* (1889) for example, "With this suffix [uka]....the root is strengthened and has the accent. (p. 445)". A similar treatment of accent appears in Chandler's *Greek Accentuation* (1881), in which long lists of suffixes are given with the final accentuation found with each. Even then, accent was not predictable in these languages, for one still had to know what paradigm type each word was associated with. Hirt (1927) gives one of the clearest statements of this typology of IE forms.

Garde's approach was to see accent as a feature associated with given morphemes. Instead of deriving the final placement of accent from the paradigmatic or derivational class, he considers each individual morpheme to be either accented or unaccented. In case more than one accented morpheme occurs in a word, the first such morpheme retains its accent, and all following morphemes become unaccented¹⁰.

¹⁰As we will see, it would be preferable to say that they remain unaccented, and that their underlying accent simply does not surface in this case; see chapter Four.

In addition, morphemes are underlyingly dominant or recessive. Dominant morphemes will retain their accents even if preceding by an accented recessive morpheme.

Thus, accent is determined by an interaction of underlying features, with a set of prominence rules determining the winner among competing accents. Such an approach removes the arbitrary assignment of forms to "accentual classes" in and of themselves, and instead sees accent as a fundamentally simple system working on a lower morphological level. We will review Garde's work in more detail in Chapter Four.

The basic question which has remained unaddressed throughout all of these studies deals with the mechanisms which are at work in cases of prosodic changes, and the kind of phonology we will need to describe these factors. It should be clear that such a question will require the examination of cases of such change at a different level than has usually been done in the past. Our focus will be on large shifts from one type of prosodic system to another, rather than on the specifics of any one system or the reconstruction of certain forms. Of course, such details will be needed along the way to give our studies a foundation.

In the next chapter, I will present some ideas toward the formulation of a working theory of prosodic change, taking into account the great flexibility which any framework must have when attempting to include the wide variety of changes which can be found in the languages of the world. Of

course, this program is not exhaustive, or even, in many ways, satisfying; it raises many more questions than it answers. Still, if we are to say anything worth saying about the examples in the following chapters, some overall theory of possible changes will be necessary.

Chapter Two: Prosodic Systems and Prosodic Change

2.1 Introduction: The Prosodic System

As we have seen in the first chapter, while considerable work has been done on the study and reconstruction of specific accentual systems, we are still without a theory of prosodic change. In this chapter, the outlines of such a theory, as well as a review of some current ideas on the representation of suprasegmental features, will be presented. Our goal is not, of course, to present a definitive answer to how and why prosodic systems change, but to present some attested cases of such change, and then go beyond the individual cases to ask how we may make use of a formal theory of prosodic features as a descriptive and explanatory tool for change in general.

When we approach the question of diachronic prosody, it is first necessary to define the scope of the term "prosody" as used in the current discussion.¹¹ I will use the term prosodic system to refer to the complete set of features in any language which share two characteristics. First, their values are defined in direct relation to other, parallel features, rather than as absolutes. Second, they are capable

¹¹From its earliest usage among Greek grammarians, the term 'prosody' has been used with a number of distinct meanings. In this study, it will be used only in reference to the rhythmic and tonal features of prosaic language, and the term 'poetics' will be reserved for the more rigorous suprasegmental requirements of verse. See Crystal (1969:55-62) for a review of the use of the term 'prosody'.

of association with multiple segments, or with structures above the segmental level. We shall discuss both of these characteristics in further detail below.

This system will include, but not be limited to, those features traditionally termed "suprasegmental", which can include such elements as stress, pitch, tone, nasalization, glottalization, and others. The prosodic system also deals with issues of vowel length, syllable weight, and patterns of rhythm and prominence which cannot be encoded through suprasegmentals alone. As we will see, the prosodic status of a given feature may change from language to language.

The prosodic system can be divided into two main subdomains: a set of tonal features, and a set of rhythmic or metrical features. It would seem clear that both types of features appear, at least on the phonetic level, in all languages; as discussed below, the typological divisions normally made between tone, pitch-accent, and stress are not exclusive or even privative. Instead, such labels should be used to indicate the relative phonological prominence obtaining between the two prosodic subsystems in a given language, the types of interactions between these features, and what might be termed the structural qualities of the overall prosodic system. This last term refers primarily to the degree of independence of individual suprasegmental elements within the prosodic system, though such structural questions appear to have further ramifications for the phonology as a whole.

The set of tonal features includes all distinctions based on variations in fundamental frequency, and is not limited to those specific systems corresponding to 'tone languages' as such. If we use the distinct functional load carried by the tonal elements within a prosodic system as a guide, we can set up a continuum ranging from the lexical tones found in languages such as Mandarin or Ewe, through a wide range of 'pitch-accent' systems, to the predictable pitch component of many stress systems (with English serving as an especially rich example). To these lexical systems must be added the patterns of intonation found above the level of the phonological word. While such intonational features are not generally included in discussions of accent per se, they are often directly relevant in the historical development of accentual distinctions, and are clearly part of the prosodic system.

The rhythmic features found in languages, by their very nature, require a holistic or systematic description. This means that such factors as stress, other types of lexical accent, and the vocalic effects often found in alternating or predictable patterns (syncope, quantity alteration, etc.) should be viewed as reflections of underlying prominence relationships among the relevant phonological elements (morae, syllables, words, etc.) within a given phonological domain rather than as independent elements. This more abstract description allows us to talk not merely of lexical stress or pitch-accent, but of all features that 'highlight'

or bring to phonological prominence some subset of the possible members in a segmental string. Such a hierarchy of prominence is often described using metrical structure, so called both because of its similarity to the organizational principles of quantitative verse and its central role in theories of metrical phonology.

Let us start our discussion of prosodic features by returning to the two basic criteria which we have established for membership in the prosodic system. First, prosodic features are inherently relative; their values can only be determined with regard to other, parallel suprasegmental units. As Lehiste (1970) describes it:

the rounding of a vowel...can be established for each vowel without necessary reference to adjacent sounds. The stressedness of a vowel, on the other hand, cannot be established without comparing the vowel with another segment in the sequence.

It is this quality of relativity that leads to the common difficulty of determining the prosodic status of monosyllables and other lexical items for which standard syntagmatic oppositions cannot be made. Often, of course, we can assign a feature such as stress to such forms based on indirect evidence (e.g. vowel quality or duration, or a systematic requirement for a stress within every phrasal group), but the direct phonetic marking of the feature would be neutralized in such environments. Thus, to talk about the stress of isolated monosyllables is, in many cases, nonsensical.

It might seem that tonal features do not display the

same kind of relativity as do metrical features, and certainly there are important differences in the minimal domains required for these features to be clearly established. But it is important to remember that even within systems with a heavy functional reliance on the use of tonal features, these features are analyzed by speakers only with regard to a relative scale within connected speech, and not as absolute frequencies. Thus, while a monosyllable is perfectly able to bear a distinctive tone, the identity of the tone often cannot be established in total isolation. This maintains the contrast with purely segmental features.

The second aspect of prosodic features which sets them apart is their domain of application, or, put in other terms, the relative looseness on the limits of their association with other phonological units. Prosodic features need not be restricted by the segmental divisions of the phonological string. They may extend over a segment, a syllabic nucleus or coda, an entire syllable, or some other section of a morpheme or word. In many cases, they may spread over several words or even phrases. We may term this feature extension.

Consider an example given by McCawley (1968) from Japanese, the noun phrase /uma no asino iro/¹², 'the color of the horse's leg', where the line indicates the pitch contour

¹²In this paper, I will transcribe Japanese using the Yale transcription, which is more phonemic than the familiar Hepburn transcription. This explains the writing of /asi/ for [aʃi] 'leg', or /kuti/ for [kutʃi] 'mouth'.

(high vs. low). The domain of high pitch is predictable from a single underlying accent in the lexical entry of the word /asi/, 'leg', and the general rules of pitch-accent in the Tokyo dialect; it includes the second syllable of the first word, the first occurrence of the grammatical particle /no/, and all of the second word. In other contexts, the pitch accent of Japanese may change between the morae of a long vowel, which are otherwise treated as unitary segments (cf. the similar pattern of Classical Greek and Lithuanian).¹³

Under these criteria of relativity and extension, vowel quantity and syllabic weight are clearly to be considered prosodic features; indeed, they have been included in this category since Classical times, and remain considered as such in recent works (e.g., Pulgram (1975)). However, the advent of autosegmental theories of morphology, which make use of a separate 'tier' to describe syllabic organization, allow us to make a more precise distinction than simply segmental vs. suprasegmental. For this reason, while vowel length and

¹³There are, of course, a wide variety of non-prosodic phonological and morphological processes that occur over an extended domain. These include vowel harmony, distant assimilation and dissimilation, and some types of 'non-concatenative' morphologies. On a broader scale, one may also point to the wholesale introduction of phonological features in the imitation of a dialect or accent (parallel to Andersen's 'adaptive rules' (1973)) or the general pharyngealization of vowels seen in some types of masculine speech in Japanese. These features are not included in the prosodic system per se because they do not involve the use of inherently relative features such as pitch and stress. Thus, my use of the term "prosodic" is considerably more restrictive than that of the London School, and more in line with the classical meaning.

syllable weight are treated in this work as part of the prosodic system, they also involve a separate category of phonological organization, timing elements. These will be described more fully in the section on autosegmental morphology below.

It would seem clear, then, that we can discuss the prosodic system as a delineated subsection of the overall phonology of a language. This system can be defined by a set of rules or structures governing the initial association of prosodic units and/or features with segmental units, and the interaction of the prosodic elements themselves within a given phonological domain. The prosodic system is, of course, in a dynamic relationship with the segmental phonology, both conditioned by and conditioning the features of that system.

Before turning to the diachronic development of prosodic systems, it will be necessary to take two short side-trips. First, section 2.2 discusses the formal presentation and analysis of prosodic features, and reviews the basic assumptions and notations of the two most useful current approaches, metrical and autosegmental theory. Then, section 2.3 presents a revised typology of prosodic systems in the light of these approaches to phonology. This typology lays the groundwork for questions of possible avenues of change, which are taken up in section 2.4. At the end of this last section are presented some general principles of diachronic prosody which arise from the examples given in the course of

the discussion.

2.2 Formal Models of Prosodic Organization

While the study of prosody within the description of language has been recognized (if not thoroughly practiced) since the earliest linguistic traditions, there have been a great number of mutually incompatible approaches employed in such work. For studies of the type presented here, it is of the utmost importance to have a consistent framework in which to discuss types of possible prosodic change. Most crucially, such changes must be seen as shifts of systems and not just the replacement of one arbitrary set of features for another.

For the purposes of this investigation, it will be necessary to make use of standard models of prosodic organization in order to discuss possible types of change. Of the current models, two can be employed to present the most useful summary of the facts: metrical phonology, as first developed by Liberman and Prince (1977) and further defined primarily by Hayes (1981), Hammond (1984) and Halle & Vergnaud (1987); and autosegmental phonology, primarily the work of Goldsmith (1976). Metrical models, which take the rhythmic or alternating nature of some types of prosodic features as their starting point, are most useful in formalizing stress-accent systems and some non-accentual processes. Autosegmental models, which emphasize spread of prosodic features and the independence of some types of prosodic "melodies" from the segmental string, have been

profitably applied to the description of tone and pitch-accent features. Together, the interactions of the two models provide a clear working formulation of prosodic systems.

In presenting an overview of these two models, I hope to show how each attempts to capture some of the generalizations of the prosodic systems of languages. I have broken up the following discussion into three parts. Section 2.2.1 reviews the basic concepts of metrical phonology, and section 2.2.2 does likewise for autosegmental theory. Readers already familiar with these models may wish to skip these sections. Readers requiring or desiring a more thorough discussion or explication of these models are referred to the primary source articles quoted, or to Goldsmith (1990). In section 2.2.3, I comment on some current issues in the two theories that are directly relevant to the present study, and suggest possible expansions of the models to handle the full range of diachronic data.

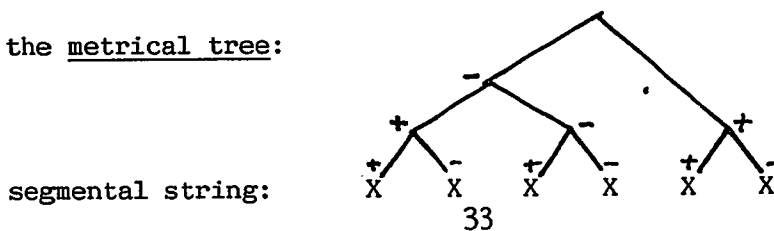
2.2.1 Concepts in metrical phonology

As with any sufficiently detailed theory, metrical phonology is not practiced with perfect uniformity. The outline of its basic concepts and terminology presented here is therefore a personal synthesis of a variety of approaches that have been taken over the last dozen years. Still, it should be sufficiently consistent not to be objectionable to those involved in its construction and growth.

In contrast to early generative phonology, metrical

theory (named for its incorporation of some of the ideas and terminology of poetic metrics) takes the relative and hierarchical nature of stress as its starting point. The crucial idea underlying metrical models is relative prominence, by which all features which can "highlight" a given segmental element (through stress, accent, increased duration, etc.) do so by assigning that element the relatively stronger position in a phonological domain. One claim of the theory is that such domains are of only two types: those containing two relevant phonological elements (binary), and those with no set size (unbounded). Each domain is considered to be headed by the single strong element within it. An unbounded domain may consist of a single element, which is automatically considered the head; such a domain is termed degenerate. In general, binary domains are the more common type; their construction leads to an more or less regular alternation of prominent elements; Prince (1983) and others have termed this "Perfect Grid" (based on the grid notation below).

Such binary or unbounded units within the phonological string are arranged within a hierarchy, so that elements on a lower level are subordinated to other elements on a higher level. This relationship is most clearly shown in one of the two common formalisms used to show metrical relationships, the metrical tree:



Here, the X's represent the relevant elements of the segmental string for the assignment of prominence. These might be morae (Greek, Japanese, Lithuanian); syllables (Latin, Russian, Indonesian); or even morphemes (many pitch accent systems, including Vedic). In this example, each level of metrical structure is built of binary domains; at the lowest level, these domains are termed metrical feet. The higher levels collectively make up the word-tree, which, by a constraining feature of the theory, may only branch in one direction.¹⁴

In the tree-based model, relative prominence is determined by the interaction of strong and weak nodes on the various levels. The highest position of prominence, corresponding in most cases to primary stress, is the element dominated entirely by strong nodes through the entire tree. The other strong elements on the foot level then represent subordinated stresses, with their total prominence determined by the number of strong and weak nodes above them. In the example above, primary prominence is assigned to the penultimate position, with relatively weaker prominence on the first and third positions. Prince (1983) has been the primary proponent of an alternative model of metrical prominence (recently adopted in more fully developed version

¹⁴It should be remembered that a metrical structure may have many more levels than this, and that not all languages clearly distinguish a foot-level from the higher metrical strata. The model is flexible in these regards, though not in others.

prominence (recently adopted in more fully developed version by Halle & Vergnaud (1987)): the metrical grid. The grid dispenses with the branching structures of the tree model, and uses instead marks prominence on a set of levels or rows above the segmental string. On each row, an asterisk is placed on the strong member of a domain to show relative prominence at that level. The more asterisks above an element, the greater number of phonological domains it dominates, as in:

```

level 3      (*                               )
level 2      (*                               )
level 1      (*   )(*   ) (*   )(*   )
level 0      *   *   *   *   *   *   *
segmental level X   X   X   X   X   X   X

```

(The parentheses used here to mark the relevant metrical domains are not part of Prince's model, but were introduced by Halle & Vergnaud (1987)).¹⁵

By convention, a 'level 0' is used to indicate which elements in the segmental string are relevant to the prominence hierarchy. On level one, the foot level, the heads of each domain are marked; again, in this example, all domains are binary. The remaining, higher levels then continue this marking system, so that the focus of lexical prominence will always be the head of the highest level of the grid.

This model has one clear advantage over the tree model:

¹⁵Hammond's (1988) critique of both Prince's and Halle and Vergnaud's versions of the grid is insightful, but the differences between this formalism and the alternative he proposes are not significant for the current study.

it makes it easier to discuss cases of 'stress clash'. Such cases arise when the standard rules for accent assignment in a given language would place stress on two adjacent elements in the string. Because of the pressure in most languages to maintain the alternating nature of stress ("Perfect Grid"), one of the two stresses shifts to avoid 'clash'. Using a now famous example, we might take the English phrase thirteen Japanese bamboo tables, in which the stress in each word, except for table, spoken in isolation falls on the final syllable: thirtéén, Japanése, bambóo, táble. When spoken as a phrase, some of the stresses shift, giving (for most speakers) thírteen Jápánese bámbóo tábles. If we use a metrical grid to display the stress patterns of these words in isolation, we have:

```

level 2           *
level 1      *   *   *       *   *
level 0      *   *   * * *   *   *   *   *
           thirteen Japanese bamboo tables

```

(I have ignored the domain bracketing here to simplify the depiction). Here, level 2 is redundant for all of the words except for Japanese, which requires it to show the secondary stress on the first syllable. Stress clash occurs whenever asterisks are adjacent on the same row above level 0. In this example, bamboo and tables are in clash, as are the primary and secondary accents in thirteen and Japanese. Stress now shifts to resolve these clashes, yielding the

attested pronunciation.¹⁶

While stress clash itself does not come up very often in the discussion of historical change, I will make use of the grid notation in this study because of its general clarity of presentation. This is not a theoretical statement, however, since either model could account, with more or less elegance, for most of the observed facts (though see the discussion of Kwakw'ala stress in Chapter Four for a case in which the grid is clearly superior).

We can now review some of the basic concepts and predictions of metrical theory which are present regardless of which formalism is used. First, a crucial part of the theory is the explanation for apparent irregularities in stress patterns through the use of the concept of extrametricality. In such cases, some element in the segmental string may be ignored when the metrical structure is built; it is simply skipped over. A well-known example is the final syllable of Latin words, which neither receives stress nor is relevant for the rule of stress placement. Given this "invisibility" of the final syllable, we would label it "extrametrical", and apply the rules of foot construction as if it were not present; see Chapter Three for

¹⁶The details of how shifting is done are quite interesting, though such technicalities are not directly relevant here. Suffice it to say that the shift from bambóo to bámboo triggers a further shift from Japanése to Jápanese, and not *Japánese. Within the model, this is explained by requiring shifting asterisks to move to the highest row available, not necessarily the nearest syllable.

examples.

An important restriction on extrametricality is that it may only apply to elements on the margin of the relevant phonological domain (Hayes (1981) calls this the "Peripherality Condition"). Internal syllables, for example, may not be extrametrical. Steriade (1987) has argued that Greek accentuation rules are best described by making use of extrametricality on two separate phonological levels: all final consonants are first labelled as extrametrical, then all final light syllables (including those made light by the previous rule) are also considered extrametrical. This is allowable, since the two applications of extrametricality are occurring on distinct organizational levels (the segment and the syllable).

A second basic concept in metrical phonology is quantity sensitivity, that is, the effect of syllable weight on metrical structure rules. In many cases, heavy syllables are treated differently from light ones (whatever the definition of heavy and light might be in the given language) when building metrical feet; such a metrical rule is term quantity sensitive (QS). Likewise, if a rule applies regularly across a word with no regard for syllable weight, it is quantity insensitive (QI). The Latin stress rule, which makes reference to the weight of the penult, is an example of the former; Swahili stress, which always falls on the penult regardless of syllabic weight, an example of the latter.

Finally, metrical theory makes use of the concept of the

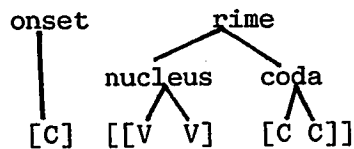
phonological cycle, as described by Kiparsky (1979) and formalized in the theory of Lexical Phonology (see Mohanan (1985) for thorough discussion of the theory). In general, it is considered that metrical structure built on an earlier cycle in the process of derivation is preserved as much as possible in later cycles, so that, for example, the stress patterns of derived words in English cannot be determined purely by the application of metrical rules to the final form, but must take into account the earlier metrical structure built at each stage of the derivation.¹⁷

What claims, then, does metrical phonology make, beyond its usefulness as a pictographic representation of prosody? We have already mentioned the incorporation of alternation and subordination as basic ideas within a stress system. Another claim is that syllabic weight can be mirrored within such a system directly, without need for arbitrary statements of stress position.

Since quantity sensitivity turns out to be extremely common in accentual systems, it would be desirable for a theory of stress to be able to incorporate syllable structure directly, and not simply make statements such as "Stress a

¹⁷I would argue that the concept of the phonological cycle, and cyclic rules in general, is greatly overused in modern phonology. While there appear to be some cases in which the cycle is needed, it should be seen as an option and not as a given. For the purposes of the present study, I will not invoke the cycle in any of the case studies presented here, and I will specifically reject a cycle-based account of the treatment of the jers in the history of Slavic in Chapter Four.

heavy penult". One way to do this is to extend metrical prominence into the syllable itself in terms of its own hierarchy of 'timing elements'. This has been done in a number of ways; for the purposes of this paper, I will make use of a model involving the following breakdown of a syllable:



This model allows the building of metrical feet over various positions within the syllable itself. Thus, for languages such as Latin, in which the light/heavy distinction is made between CV-syllables on the one hand and both CVV- and CVC-syllables on the other, it is the rime that is distinctive: a heavy syllable has more than one element in its rime (a branching rime). For other languages, such as Kwakw'ala, in which the light/heavy distinction is between CV(C₀) syllables on one hand and CVV(C₀) on the other, the rule is more specific: a heavy syllable has a branching nucleus.¹⁸

In either case, a branching element can make up a

¹⁸

It would also be possible to make use of the more current approaches to syllable structure, such as mora-based models or x-skeleton timing grids. I have used this older CV-type explication primarily as a shortcut, since it is often easier to parse, and the details of the various formalisms rarely come into play in the types of diachronic studies involved here. See the discussion of syllable structure in Chapter Five for a further review of the relevant issues.

metrical foot on its own, leading to greater capability to bear or attract stress. Thus, it can be argued that possible distinctions in syllabic weight are constrained by the nature of the metrical foot. It would be impossible, for example, for a language to count CVC syllables as heavy, but CVV syllables as light.¹⁹

Another claim of metrical theory is that the set of possible stress systems are constrained by the limited number of options in the formation of feet and higher structures. Feet may only be binary or unbounded, for example.²⁰ All feet within a given domain must be of the same type. On higher levels, headedness is assumed to be isomorphic, though the exact limits have never been formally stated. In short, metrical theory seeks to exclude, on formal grounds, certain otherwise possible patterns of stress.

Finally, at least a few authors have claimed that the structures are rules necessary for the metrical description

¹⁹As detailed in the next section, such foot-construction rules can be seen as interacting with the timing elements of the language, which often model acceptable segmental patterns as well. The small number of examples in which syllabic onsets appear to be relevant for weight distinctions will not be discussed here.

²⁰Though there have been arguments that some languages must make use of ternary feet; see Everett (1986) on Piraha and Hanson (1989) on Garifuna. Hanson has argued that all languages that appear to require ternary feet have only (or predominately) CV-syllables, and that a type of resolution (2 light=1 heavy) is involved. The case of Piraha is more complicated, however, because of a wider inventory of syllabic types and the apparent reference to syllabic onsets in determining syllable weight.

of stress can be seen to play a role outside of purely accentual phonology. Selkirk (1977) has argued for the metrical foot as a basic organizing unit of English, effecting such disparate processes as the flapping of the phoneme /t/ and the permissible patterns of the relatively rare cases of infixation (mostly obscene) found in English (see Kiparsky (1979) for further discussion of such data from English). Hayes (1980) has shown that the metrical foot is involved in the determination of segmental changes in Yiddish, and a number of the case studies in the following chapters show other non-accentual effects of metrical structure as well.

2.2.2 Autosegmental Theory

In contrast to metrical models, autosegmental theories of prosody generally do not propose to construct an overall system of phonological organization for a language. There is no parallel to the prosodic structure resulting from the application of metrical rules. Instead, autosegmental theory is primarily concerned with the association of individual suprasegmental features to each other and to what can be termed "timing-positions" which organize features into segments.²¹

Since its development by Goldsmith (1976), autosegmental theory has evolved in response to a set of observations con-

²¹This is not to say, of course, that autsegmental analysis does not sometimes yield systematic insights on a given language.

cerning tonal sequences, especially within fairly 'pure' tone languages. Goldsmith presents a number of cases in which "tone-bearing units" (TBU's), that is, whatever phonological elements in a given language can be associated with tonal features, appear to be associated to one of a number of tone melodies, with the exact realization of such association varying based on the number of tone-bearing units in the segmental string. Thus, a monosyllable with a falling contour tone, a bisyllable with the sequence High-Low, and a trisyllable with the sequence High-Low-Low could all be seen as the result of the association of the melody H-L to various segmental strings. In the trisyllabic example, the final Low tone spreads to fill in the tonal features of the 'extra' segment. The representation of these examples would be as in:



where S represents a syllable or other tone-bearing unit. As presented here, tonal units (whether understood as feature bundles or 'tonemes') are represented on a separate tier from the "segmental" elements; thus their status as autosegments.

Much of the work done in autosegmental tonology has been concerned with working out the details of the association rules between the tonal features and the TBU's. I will not go into the details of the various arguments here, as most of them will not be pertinent to the discussion at hand. A few of the formalisms, however, should be introduced.

First, it is important to consider what any theory of phonology considers to be the 'unmarked' or 'default' case in a given process. Autosegmental theory presents a number of such givens. All other things being equal, tonal units are associated with TBU's one-to-one, from left to right. If there are more tones than TBU's, the final tones may either form contour tones on the last TBU, or excess tones may be deleted; this is considered a language-specific feature. If there are more TBU's than tones, the last tone spreads to fill in the remain TBU's; again, there may be language specific restrictions on this process. Of course, other types of tone spreading can occur, in either direction. One important generalization, however, is that tone association lines may not cross.

Second, the treatment of diacritic accent within autosegmental theory will be important to our discussion. The simple type of tonal association exemplified above treats all TBU's equally. It is often necessary to distinguish between such elements, primarily due to the assignment of underlying accent to a given syllable or morpheme. Goldsmith introduced the asterisk notation to indicate elements which had special status in the assignment of tonal features, such as:



In (a), no syllables are underlyingly accented, and the tone melody is associated to the first elements of the string by

default. The final low tone can then spread to the third and fourth elements.

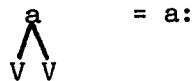
In (b), the second TBU is marked as accented. Though the details of the resulting association may vary, the most common effect of such accent is to usurp the role as the first element for tonal association. Here, the initial High tone associates to the accented TBU, and the Low then associates to the following units normally. The treatment of the skipped first TBU is unpredictable. In some languages, it would receive a default Low tone, the result of having no autosegmentally assigned tonal features; in other cases, the High tone would be free to spread leftward, with the resulting melody H-H-L-L.

Example (c) demonstrates another phenomenon seen in a wide variety of languages: the floating tone. Here, a High tone is introduced at the margin of a given phonological domain, rather than as a feature of a given segment or morpheme. Such tones are often carried by certain types of phonological boundaries, or may be markers of grammatical categories. In such cases, floating tones are assumed to 'dock' on the nearest available accent, or on the nearest TBU if no accent is available. In this case, the floating High tone associates with the accented penultimate element; if the accent had not been present, it would have associated with

the final TBU.²²

Third, we will need to discuss some of the implications of the extension of autosegmental theory into the area of morphology. McCarthy (1982) has pioneered the analysis of segments themselves as autosegmental "melodies" attached to a "timing skeleton" which determines both duration and syllable structure.

In languages such as English, the division of segments into CV-slots and attached features applies almost vacuously; in other cases, most notably in Semitic, it can yield intriguing insights into non-concatenative morphology. Without going into the details of the specific languages, we should simply note here that a "long" segment is identified in this framework by being attached to two timing slots:



Segments may "float" or "disattach" in the same manner as tones in the earlier discussion. Such models will help to explain some of the changes caused by metrical rules involving syncope and vowel weakening, especially in Latin (see Chapter Three), as well as allowing us to make important

²²Hyman (1989) has argued that the notation of underlying accent has been overused in autosegmental work, especially in Bantu. He reasonably points out that if the purpose of the asterisk is to indicate a position which will later receive a High tone, then it would be more correct to assign a preattached High tone to that element. I will argue in my discussion of Vedic, however, that some types of prosodic systems require a distinction between accent as an underlying feature of a morpheme and the tonal features which are the surface realization of such accent.

statements about the intricacies of syllabic structure and syllable weight (see Chapter Five).

Finally, autosegmental notation provides a convenient way to talk about the deletion of suprasegmental elements. Many languages have a restriction limiting the number of certain tones that can occur within a given phonological domain. In many Bantu languages, for example, a process generally known as Meussen's Rule changes a series of one or more High tones to Lows after a High. In Heiltsuq, a Wakashan language, no more than two High tones may occur within a phonological word, whether the Highs are adjacent or not (see Chapter Four). Such rules can be depicted as the deletion or replacement of autosegments on their own tier, with the later rules of association applying normally.

2.2.3 Issues in metrical and autosegmental theory

The evidence from diachronic change discussed in Chapters Three through Six raise a number of questions concerning the application of metrical and autosegmental theory. It seems best to present two of the basic questions now, so that it will not be necessary to interrupt the case studies when problems arise.

1) Though the point has been specifically questioned in some recent discussions, it is still assumed by many researchers that the building of metrical structure is exhaustive, that is, all elements within a domain are obligatorily part of the metrical grid except for those specifically noted as extrametrical (and even these elements are incorporated into

the metrical structure before the end of the derivation). In Halle & Vergnaud, for example, all syllables that cannot be incorporated into metrical feet by standard rules automatically become degenerate feet. Goldsmith (1990) explains this obligatory participation in the grid as a type of prosodic licensing:

We begin by postulating that the sequence of rhymes of a word must be analyzed into stress feet in such a way that every rhyme is part of some stress foot, in much the same way that every segment must be syllabified or licensed, and that every word in a sentence must be part of some higher-level syntactic constituent, excepting the odd stray syllables which are adjoined to the larger word structure. (p. 171)

Yet there seems to be a growing body of evidence that, at least until very late in the derivation, some languages allow parts of phonological words to remain outside the metrical grid. In many instances, phonological rules are sensitive to an "in foot" vs. "out of foot" distinction. Examples include the treatment of vowels in Nootka and the rule of jer deletion in Slavic, both discussed in later chapters. In these cases, segmental rules must know whether a given segment is within the single binary foot of a word or not.

This is not, of course, a direct argument against the licensing requirement, since there are at least two possible means to reconcile these examples. First, it can be argued that these are not "in foot" rules, but "in primary foot" rules, that is, they are sensitive to the metrical foot containing the most prominent element in the word. But this

appears to run into trouble with these examples. In Nootka, it weakens the contrast with Kw'akwala, a sister language, in which there is clear evidence for iterating foot construction. In Russian, there is no evidence for secondary metrical feet, especially since this metrical structure is not related to the accentual system.

The second possibility is that these types of rules apply before the extension of metrical structure to these segments, or that a single foot is built and "out of foot" elements are licensed directly by the word tree. This last possibility does not match Goldsmith's statement above²³, since not all possible elements are incorporated into feet, but appears to be the most straightforward solution to the formal problems of these examples. Since it appears that some types of diachronic change involve a transition from iterating to non-iterating feet or vice-versa, the possibility of this type of distinction must be acknowledged.

A closely related problem involves feet that have weight restrictions on their construction. If we have a system which builds right-headed binary feet from right to left in a word, with the condition that a weak node may not dominate a heavy syllable, what will happen if the last syllable in the word is heavy? The standard solution is to make that

²³Goldsmith would apparently want to require that a syllable be part of a foot to be able to be incorporated into the word-tree. He specifically rejects the assignment of stress by the word tree when feet cannot be built in some form, as in his discussion of Khalka Mongolian and Aguacatec Mayan (1990:188-189).

syllable (and all heavy syllables not followed by a light syllable) a degenerate foot, fitting in binary feet wherever possible.

If licensing of all elements is not required at the foot level, there is another possibility: feet are only built where their structural descriptions are met, with all other syllables left "unfooted" until later (or perhaps licensed directly by the word-tree structure). In languages which construct a single foot, this has the effect of "moving" the foot through the word until a proper sequence of syllables can be found, much like repositioning a jigsaw puzzle piece until it fits. A decision between these two approaches can be guided by the examples discussed in the four following chapters.

2) Most recently, there has been growing debate on whether a given language can have more than one metrical structure. Poser (1990), who has argued for an initial bimoraic foot in Japanese, states that the existence of such structure disproves those theories which account for Japanese pitch accent through the use of metrical structure, since "insofar as feet are part of the phonological representation, not merely a component of phonological rules, a language may have only one foot structure" (p. 103), though he concedes the possibility that this could be disproven if both systems were well-motivated. Lahiri, in her discussion of Germanic (1990) has also suggested that, if metrical theory is to be adequately constrained, only one metrical structure should be

accepted per language.

It seems, however, that such a rejection of multiple metrical patterns may be only partially correct. The decision must be based on two further questions: what range of features can be described using metrical frameworks? And what is our diagnostic for distinguishing metrical systems from non-metrical systems?

Our first question remains open. Metrical models were first developed to account for stress, especially in systems involving alternating or fixed accent. We have seen how some studies have already applied metrical rules to non-accentual questions, and Poser's Japanese foot governs such processes as the rules for some types of hypocoristic formation and compounding.

There have been, in the most recent work, an effort to suggest that such "metrical" structures are not metrical at all, but belong to some other level of phonological organization. Hammond (1990) has made a distinction between "stress feet", which are used when building structures needed for accent placement, and "parsing feet", which establish sub-domains within a phonological string which are relevant for non-accentual rules. Such an approach works well when the two types of feet are clearly disjoint (as in the case of Slavic accent and jer deletion), but seems incorrect when the stress feet and parsing feet are identically positioned (as in Nootka, Chapter Four). I would prefer to argue that there is a single type of foot-building rule, making use of the

conventions and limitations of metrical theory, but that it can be instantiated in a number of distinct ways in various languages, or even simultaneously in a single language.

The key issue in answering our question on the range of application of metrical structure appears to be the degree of abstractness which we wish to allow. Those who would restrict metrical phonology to matters of stress and accent delegate other types of prominence-assigning rules to separate structures. In order to justify my claim that a more abstract view of metrical structure is needed in diachronic studies, we will need to examine the concept of prominence more closely, and spend some time looking at a clear example of a highly abstract, apparently metrical system.

2.2.3.1 On Prominence

One of the main difficulties encountered in the application of metrical theory to cases of prosodic change is the number of terms which can be ambiguously applied to quite distinct phonological facts. Among these are the terms "strong" and "weak", used of both elements and positions within the phonological string. A short discussion of the relationship of these terms to the larger concept of "prominence" will help avoid problems in the later discussion.

As originally introduced into metrical theory by Liberman and Prince (1977), "strong" and "weak" were used as labelling terms for two paired constituents in a metrical

structure. Within each pair of constituents (the metrical foot), one member would always have greater relative prominence than the other. Thus, these terms represent

a relation defined on sister nodes, and the apparent "node labels" *s* and *w* cannot have any existence independent of the definition of such a relation. Therefore an isolated [*s*], an isolated [*w*], and the configurations [*ss*] and [*ww*] are meaningless. (p. 256)

In this early version of the theory, the labels [*s*] and [*w*] corresponded only imperfectly with the SPE-type features [*1stress*] and [*0stress*]. Since metrical structure could not deal directly with the secondary stresses found in words such as gymnast or raccoon, Lieberman and Prince settled for a more unilateral well-formedness condition: If a vowel is strong, than it is [*+stress*]. Weak vowels could potentially

be [+stress]. This limitation on the predictive power of metrical structure rules was eliminated by Selkirk's description of foot structure rules (1980).

It is important to note that the discussion of strong and weak elements here deals entirely with questions of stress assignment. The extension of these terms to other types of relative prominence, crucial to some of the cases discussed in the next chapter, represents an expansion of the application of a metrical framework in a number of new directions. Because of the common meanings of these terms, however, they are not necessarily the best choice to describe the more abstract pattern of "strength" and "weakness" found in the wider sense. I will thus use the term "prominence" rather than "strength", and define it as follows:

Phonological prominence is a property assigned to an element within a phonological string with the result that one or more rules which take that phonological string as their domain of application are more likely to apply to that element if their general effect is to increase the salience of that element, and are less likely to apply if their effect is to decrease the salience of that element.

The use of the term "salience" here is, of necessity, vague. There is a marked subjectivity in the discussion of the various factors which make a given phonological element more "noticable" or "highlighted" within a domain, in much the same way that it is difficult to give a careful phonetic description of a syllable. Since a more precise definition is not available, I shall attempt in each of the following case studies to point out what features are being identified with prominence in each example.

Notice a number of implications of such a definition. First, phonological prominence can be a feature of a wide range of phonological units: autosegmental "slots", segments, sub-syllabic sequences (rimes, nuclei), syllables, morphemes, words, phrases, etc. Second, it can be assigned in a wide variety of ways; the specific type of prominence which can be identified with "strength" in the traditional sense is assigned by metrical structure, and thus will sometimes be termed "metrical prominence". Other sources for prominence can be a lexical feature, a morphological status or process,

a general rule of phrasal position, or even a syntactic or morphosyntactic rule (such as often occurs in the syntax of clitics).

Third, prominence can be marked either positively, by the application of a rule which increases the "highlighting" or salience of the element, or negatively, by the lack of application of a rule which decreases salience. Examples of the first type would be stress assignment rules, vowel lengthening processes, or the addition of a unusual phonetic feature to some element, such as the pharyngealization process found in some Japanese dialects (McCawley 1965). Another aspect of "positive" prominence can be termed "survivability", e.g. the carrying on of an elements distinctive features in cases of vowel coalescence, or the choice of directionality of assimilation processes. The latter type of "negative" prominence would include immunity to vowel shortening, deletion, contraction or reduction; resistance to assimilation to another element; or certain types of blocking which occur with the spread of harmony features.

The relevance of some of these definitions of prominence to the study of prosodic systems is, of course, slight. It should also be noted, however, that the evolution of a prosodic system can often involve stages in which a marker of accentual or metrical prominence may develop into a prominence of some other type, and vice versa. Thus, we may find (as in the Chagga example discussed in Chapter Six) that

a metrical prominence (i.e. "stress") may no longer have any of the surface phonetic aspects that we normally associate with stress itself, but may survive as a resistance to vowel deletion alone. Such changes must be taken into account if we are to come to an adequate theory of the diachronic change of prosodic systems.

A challenge to such a broad theory of prominence can be made on the grounds that such a definition is abstract to the point of being vacuous. It can be argued (by those that would hold the opposite position from the one stated earlier) that metrical theory can account for the vast majority of these "prominence effects" through normal rules of foot and word-tree construction. All prominence, under such a view, would be identifiable with metrical strength. I would answer, however, that to follow this line of argumentation is, in fact, to broaden the idea of "metrical theory" to the point where it loses its value as a working hypothesis of prosodic organization. It is clear that, if as I will argue, we wish to view tonal features, pitch accent, stress accent, and a variety of non-accentual phonological changes as manifestations of prominence for the purposes of diachronic descriptions, then we are dealing with a large number of rules and elements which cannot be treated metrically without resorting to a truly unrestrained theory.

Thus, unless we have a clearer conception of what is and is not a metrical process, we are liable to fall prey to the equal and opposite errors of constraining metrical theory

either too much or too little. I will attempt, in the course of the case studies presented here, to explain my choices for the representation of prominence relationships, so as to point out the strengths and weaknesses of a metrical interpretation of the facts in each case. For the moment, an examination of Passamaquoddy will illustrate some of the difficulties involved.

2.2.3.2 Example: Passamaquoddy Vowel Strength

In LeSourd's analysis (1988, 1989), Passamaquoddy phonology makes a crucial distinction between what have been termed "strong" and "weak" vowels (the use of these labels is taken from Goddard (1969); while they share the ambiguities of the similar metrical terms discussed above, they are in general preferable to LeSourd's "stressable" and "unstressable" for the purposes of the present discussion). Of the underlying vowels /e a i o ə/, /e/ is always strong; /i/, /a/, and /o/ are usually strong, and their weak variants occur almost exclusively before certain types of consonant clusters (LeSourd 1989). Schwa is usually underlyingly weak, though some occurrences must be marked as strong in their lexical representations.

The strong/weak opposition is relevant both for the Passamaquoddy stress rule and for a set of syncope rules which appear to be independent of the stress rule for the determination of their structural descriptions. Underlyingly strong vowels appear never to undergo weakening, but weak vowels can be strengthened in a number of environments. All

of these strengthening processes are relevant for the stress rule, while only some subset are relevant for each of the syncope rules.

Of the seven strengthening rules which LeSourd posits for Passamaquoddy, only three are directly relevant for our discussion; the other four strengthen weak vowels between or following certain types of consonant clusters²⁴. The remaining rules are as follows:

Weak vowels are strengthened:

- a) in the final syllable of a word;
- b) in the initial syllable if followed by a sonorant-weak vowel sequence;
- c) in an even numbered position, counting from left to right, in a maximal series of /C₀V/ sequences in which no /V/ is strong, either underlyingly or through the application of an earlier rule.

It should be emphasized that "strong" here does not imply "stressed", though the Passamaquoddy rule ignores weak vowels when assigning stress. The stress rule itself can be stated in two parts:

- a) Stress the first strong vowel in a word;
- b) Stress every even numbered strong vowel in a word, counting from right to left.

Examples (LeSourd 1988:140):

wícohkémal 'he helps the other'

wícohkekémo 'he helps out'

wícohkétahamal 'he thinks of helping the other'

²⁴Though the role of /h/ in determining vocalic strength, and the distinction between sonorants and obstruents as determiners of vocalic strength have some parallels to the situation in some of the Wakashan languages discussed in Chapter Five.

In these examples, all of the vowels are strong, meaning that they are all taken into account when applying the stress rule. The alternating nature of the second part of the rule is clear in examples such as (1988:140-141)

pémskótek 'field'

pémskotékil 'fields'

Notice that if the two sections of the stress rule lead to adjacent stresses on the first and second syllables, there is no deletion or stress-shift to address the potential clash, though the stress of the second syllable is subordinated to that of the first. Overall, it is the last stressed vowel in a word which receives primary stress.

If a word contains weak vowels, they are "invisible" to the stress rule, neither being eligible to receive stress nor counting in the alternating stress count, such as the first schwa in kalóltówək 'they (dual) argue with each other', or the schwas of the second and fourth syllables in ásawacək é po 'it is flopped over to one side'. In the first example, the schwa of the final syllable is strengthened by part (a) of the strengthening rule. In the second form, the second and fourth schwas in the sequence of syllables containing no strong schwas are strengthened by part (c) of the rule. In a form such as élamoss, 'dog', the first schwa is strengthened by part (b) of the rule.

The stress rule as given here seems to be clearly metrical in nature, involving an iterating, quantity sensitive binary pattern from right to left. The only

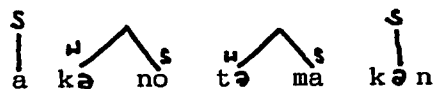
seeming addition needed is the automatic initial accent, but this is probably not a required stipulation. If we adopt a version of metrical theory which allows so-called degenerate (single-member) feet to be treated as either strong or weak by default in any given language, then it is clear that the initial syllable will always end up stressed. In words with an even number of strong vowels, it will occupy the strong node of a normal binary foot; in words with a odd number of strong vowels, it will form a single foot by itself, which we may consider to be strong. This would clearly be the better solution, since a stipulated initial accent would seem to imply the construction of a binary foot at the left margin of the word. Such a foot, however, should block foot construction by the second part of the rule onto the second syllable, which is clearly not the case.²⁵

If the stress system of Passamaquoddy is to be formalized through the use of metrical structure, how should we then account for the rules assigning strength to weak vowels? LeSourd suggests three possible approaches. The first, the assignment of the diacritic feature [+strong] by a set of apparently unrelated rules, he rejects as the most arbitrary and unrevealing option. Second, he suggests a metrical model along the lines of those discussed in Stowell

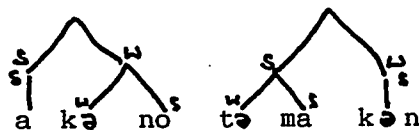
²⁵We will see a precisely parallel situation in our discussion of the syncope rules of Oscan and Umbrian in Chapter Three. For the moment, note that the structure under discussion is not a stress-assignment rule, but a separate syncope rule.

(1979) and Halle & Vergnaud (1984). Such a model would involve the use of an underlying diacritic as well, here termed [+accent]. The basic metrical structure would be composed of binary feet labelled weak-strong, built from left to right, with an odd final syllable forming a strong degenerate foot. Metrical rules would be constructed in such a way that [+accent] elements could not stand in the weak positions of metrical feet; [-accent] elements, however, could occupy the strong node of a foot, and would then be treated as "strong".

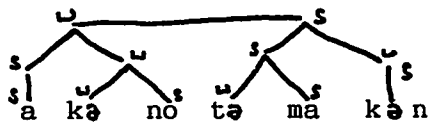
Examples of the derivation of vocalic strength through such a metrical framework include this description of the word ákanotámákan 'story', in which the first two occurrences of schwa are weak:



Binary, right-headed feet are built from left to right, with inherently strong elements always forming the head of such metrical pairs. The /a/ in initial position must form a degenerate foot, since it cannot pair with the second syllable, and does not have a weak vowel to the left of it.



The feet (which LeSourd calls "subfeet") are then gathered by the next level of organization, in which left-headed constituents are built.



Finally, the right-headed word tree is built, assigning primary prominence to the syllable /ma/. Note that in this example I have not indicated the feature [+accent] which, in this version of the theory, marks strong vowels in their underlying description.

What, then, does this model gain us? If applied in this manner, very little. It is clear that we can now apply the Passamaquody stress rule with the revision that the heads of the feet we have created are the only vowels which count for stress assignment, but the higher layers of the metrical tree are redundant, and overall the degree of information encoded under such a system is minimal.

The weaknesses of this version of a metrical approach are, the following. First, it requires a diacritic feature which seems just as arbitrary as the parallel feature in the first theory. Second, it treats the vast majority of vowels (which are underlyingly strong) as the marked case. The alternating assignment which such a system would take as the norm actually only becomes necessary in sequences of weak vowels, a condition which is not overly frequent in the data. Finally, it runs into the possible complaint of multiple metrical structures within a single phonological system, though I do not consider this a problem.

Because of these shortcomings, LeSourd suggests a third approach, which handles the strong/weak opposition directly

on the CV-tier (within a theory of autosegmental phonology as presented in Clements and Keyser (1985)). LeSourd takes a "strong" vowel as one which is associated with a V-slot on the CV-tier in its lexical entry, while a "weak" vowel is floating, i.e., is not associated with a V-slot. Underlyingly strong schwas are then simply stipulated as having such an association to begin with, and the rules governing the strengthening of weak vowels are written so as to insert an epenthetic V-slot on the timing tier, which then associates with the previously floating vowel. So, a form such as aps kil 'he is small' would have the following associations on the CV-tier:

a	p	s	ə	k	i	l
V	C	C		C	V	C

Note that the schwa, being underlyingly weak, is not associated with any element on the timing tier. If nothing occurred to give it a vowel slot, it would continue to be weak, and thus both unstressable and eligible for syncope. However, the /ps/ cluster preceding the schwa is one of the phonotactic triggers for strengthening; the result is the addition of a vowel slot and the resulting syllabification as

a	p	s	ə	k	i	l
V	C	C	V	C	V	C

Can such a trigger for vocalic strengthening be motivated under such a model? In an ingenious (but potentially flawed) answer, LeSourd shows he is able to capture both the alternating pattern of strong and weak

schwas and the various consonant cluster effects through rules detailing the process of syllabification. After inherently strong vowels have syllabified with a preceding consonant, V-slots are added as needed in order to form maximal syllables with the remaining consonants. In this way, the observed pattern of strong and weak vowels is created automatically (recalling that within this formulation, "strong" means "having an associated V-slot"). An example showing the full process is the derivation of asəwəkəkəpəw, the underlying form of asəwəkəkəpəw 'it is flopped to one side (all schwas are underlyingly weak):

start a s ə w ə c ə k ə p ə w
 | | | | | | | | | |
 V C C C C C C C

Final Syl. a s ə w ə c ə k ə p ə w
 Epenthesis | | | | | | | | | |
 V C C C C C V C

Vowel Epen. a s ə w ə c ə k ə p ə w
 | | | | | | | | | |
 V C C V C C V C V C

Here, a vowel slot is added to allow the maximal syllabification of a sequence of unsyllabified consonants, /wək/. A second slot is then added to allow the unsyllabified /k/ to form a syllable. No other V-slots are added, as no other unsyllabified C-slots remain. The result is the strengthening of the second and fourth weak vowels in the sequence, exactly as called for by the earlier rule. Stress is then assigned to give the final form asəwəkəkəpəw.

with final /əw/ becoming /o/ by a regular contraction rule.

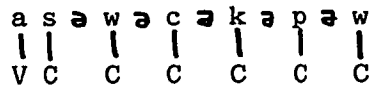
While such a solution is quite elegant, it does have its problems. For one, the treatment of the final syllable, which needed no special attention in the metrical approach, now must be stipulated (as in the last example). In addition, LeSourd needs to treat certain initial consonants as extrasyllabic for the purposes of the strengthening process. It seems odd to invoke such a "metrical" concept when we are trying to tie the whole issue to syllabification rules. There are two more serious problems: since, in CV-phonology, elements that are not "sanctioned" by a position on the timing tier are assumed to never surface, why are the schwas that are not associated with vowel slots not syncopated in all cases, instead of surviving in some forms? And why do epenthesis rules which have syllabification of consonants as their justification only apply when floating schwas are available?

There is the larger difficulty with the pure CV-based theory: it is based on a totally abstract algorithm for syllabification, since the syllables generated by the epenthesis rule are often different than the actual surface syllabification (see example). Can we improve on the whole question of strong and weak vowels in Passamaquoddy? I believe the answer is yes, if we can combine the metrical and autosegmental models as suggested in general terms in the earlier part of this chapter.

The metrical theory that LeSourd rejects is, at least at

the present stage of the theory, something of a straw man. There is no need for the strength of vowels to be indicated through a diacritic feature like [+strong]. We can incorporate the elegance of the CV-model by assuming that metrical constituents can be build on the 'output' of a CV-tier organization of segments. The only requirement is to allow the rules of metrical feet construction to be sensitive to associations to the CV tier itself; the quantity sensitivity condition would now be stated as "segments associated with V-slots cannot be in a weak position within a metrical foot".²⁶ If we take the same example of

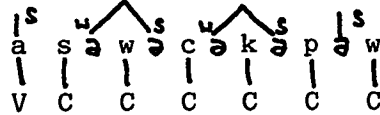
asəwəcəkəpəw, the basic CV association would be the same:



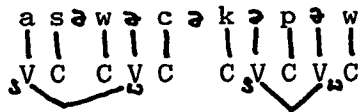
Then, the same metrical structure as suggested above is

²⁶This statement would, to be sure, be found unacceptable to a number of scholars working in metrical and autosegmental theories. The complaint against it would be that metrical rules should not be able to "see" both the segmental and timing tiers at the same time, or at least should not be required to by any properly designed theory. This is, I believe, a reasonable argument. However, the theory does allow metrical rules to see the difference between singly and multiply attached segments (i.e. between long and short vowels), so that some types of involvement by the CV-tier are allowed. It is also possible that the CV-model presented here is not optimal. I argue in Chapter Four that the present day distinction between full vowels and reduced vowels in Kwakw'ala is based on a historical opposition between long and short vowels, and is still best underlyingly represented with single vs. double vowel slots respectively. Since, like Kwakw'ala, Passamaquoddy make no phonemic distinction between long and short vowels, it is possible that a similar model of CV phonology would work here as well, eliminating such difficulties.

built: iterating binary feet, right-headed, from left to right, with the condition of quantity sensitivity just mentioned. The results in this example would be



Weak vowels now in strong metrical positions would be strengthened, that is, associated by epenthetic vowel slots; the weak positions would remain unassociated for the time being. Stress would then be assigned by its own rule, building iterating binary feet, right headed, from right to left, on the CV tier itself. This would immediately capture the "invisibility" of weak vowels, and give in this example the result



building two binary feet over the four V-slots. The "weak" vowels are now eligible either for syncope, or for strengthening by a later rule. Such a model also points out an interesting pattern that the pure CV model misses: the metrical structure needed for the strengthening rule and the metrical structure used to assign stress are effectively mirror images of each other. If, as LeSourd suggests, "[i]t seems more than likely that the distribution of stressable and unstressable [i.e., strong and weak] vowels in Passamaquoddy reflects the stress rules of an earlier stage in the history of the language, and that the current Initial Stress Rule and Alternating Stress Rule represent a process

of stress assignment which has been imposed on the output of this earlier system," (1988:175) then we may have evidence for the reversibility of stress rules. Such patterns will be seen in examples from Slavic and Celtic as well, where Polish and Czech in the former, and Old Irish and Welsh in the latter, seem to be derived from mirror-image systems.

Thus, if we are not willing to build two entirely distinct metrical structures to handle the various rules (including the stress rule) of Passamaquoddy, we will have to accept that "prominence" is a broader feature than metrical strength. Of course, the current example shows that we need not accept such a claim; perhaps languages can have multiple metrical structures, each structure applying to some well-defined subset of the phonology. Passamaquoddy would appear to be an excellent example of such a language, and, as we will see in Chapter Three, section two, the history of the Italic languages would point to a similar split in the metrical systems of those languages as well.

However, if we accept the multiple application of metrical structure-building rules to a phonological string, then we are back to questioning the need for non-metrical prominence assignment. Can all cases of positive and negative prominence be re-analyzed as metrical strength in this case? Again, I think the answer is no. The reason is that we fatally weaken the claims of metrical theory if we attempt to stretch it too thin. To say that a certain element is prominent is to say very little; to say that it is

a strong member of a metrical tree is to say considerably more. It is preferable, I believe, to maintain the current limitations on metrical theory per se, and to allow the cases of apparent "strength" which cannot be accounted for in metrical terms to be dealt with by other formal approaches to prominence. This is also truer to the facts, since many of the examples we will discuss clearly assign prominence in ways that would be difficult to describe in metrical terms, even using some of the broader versions of the theory.

Returning then to the question which introduced this digression, we can now consider what diagnostic we might use in determining whether a given rule is metrical or not. In these cases, we can see two common features shared by all suggested metrical rules. First, all involve prominence contrast between otherwise "equal" segments. In our examples, something is done either to strong or weak metrical positions to set them apart. Strong nodes may receive stress, undergo vowel lengthening, or become the locus for floating tone attachment. Weak positions may be syncopated, shortened, or simply remain unstressed. While a wide range of surface features marking prominence or lack thereof could be imagined, the contrast itself must be present.

Second, all set up structured domains within the phonological word. In some cases, such as Nootka or Japanese, metrical structure sets some syllables of a word apart for special treatment by phonological rules. In other

cases, the relevant structure is coextensive with the phonological word, but serves as one of the markers distinguishing one word from another (or, in the other direction, showing the phonological unity of a word-clitic group).

3) Many of the recent developments in autosegmental theory, including underspecification and feature geometry seem to have little application in the current study. We will see that an underspecification analysis can help explain some of the facts of Latin vowel weakening, and some aspects of feature geometry are useful in explaining the effect of glottalization on syllable weight in Wakashan, but otherwise I will not touch on these issues to any substantial degree.

2.3 A typology of prosodic systems

2.3.1 A Review of Prosodic Description

From its earliest days, linguistics has noted the difference between languages having primarily stress accent, and those making use of pitch distinctions. Because of the languages available for study within the Western linguistic tradition, earlier authors deal primarily with the these different realizations of lexical accent, rather than drawing a tone vs. accent distinction.

We have already discussed the study of prosody to a certain extent in the first chapter. It should be noted here that the languages of the Indo-European group, especially those studied up to the nineteenth century, present a two-way split in their general typology: stress (Latin, Germanic,

Celtic, some modern Slavic) vs. pitch-accent (Greek, Vedic Sanskrit, Baltic, some Slavic). Within this division, the stress systems were divided into phonemic (free or mobile: Russian, or the earlier stage of Germanic reconstructed on the basis of Verner's Law) and non-phonemic (either immobile or predictable: Latin, Celtic, Czech and Polish). Within Indo-European, there are no cases of predictable pitch accent such are found in some American Indian and African languages. Thus, in its earliest stages, the study of prosody was the study of accent placement and its conditioning by segmental (syllabic) or morphological factors. Even when the Semitic and Uralic languages were added to the discussion, no typologically important distinctions were found.

All of the languages mentioned above shared a number of common prosodic features. Words (defined morphologically) can be divided into accented and non-accented classes; the non-accented forms are clitics and form a single phonological word with an accented form.²⁷ In general, each phonological word had one and only one lexical accent, with the exception of some types of compounds, and with a special accent-addition process in Greek (see Chapter Three). Immobile stress accent could fall either on the initial syllable or the penult, but not in other positions (the fixed antepenultimate accent found in some dialects of Macedonian

²⁷The exception here are finite verb forms and vocatives in Vedic, which are regularly unaccented, and a few verbal forms in Greek; these will be discussed in the sections on those languages.

appears to be a relatively recent development). Free accent was unlimited in its placement in some cases (Russian, Vedic), but was limited in others (Classical Greek).

These examples led to a binary typology in earlier work: stress or expiratory accent vs. pitch or musical accent. When western scholars came into contact with Chinese and other languages showed the insufficiency of such a division, the typology was refined. Within the musical accentual systems, it was now possible to distinguish two separate types: tonal systems, in which each syllable carried a distinctive tonal contour, and pitch accent, in which the "peak" element within a domain was marked by a tonal distinction. This three-way typology, which proved useful as American and African data was added to the picture, remains the current descriptive framework for prosodic systems.

It has been widely recognized that these three options (stress, pitch accent, and tone) do not represent three separate and distinct types of systems, but rather should be seen as relatively clear points on a continuum of possible prosodies. But it is this very point that has been difficult to put into practice in the description of change, since the formal models used to describe the various systems were incompatible. Before turning to the issue of providing a better formalism, let us review each of these three major types in turn.

2.3.2 Tone languages

We may define a 'pure' tone language as one in which

every possible tone-bearing unit (TBU) in the segmental string is assigned obligatory distinctive tonal features, at least at some stage in its derivation. The TBU is usually the mora or the syllable; sonorants may be counted as eligible for tone within either type of system. Because of this uniformity of tonal assignment, tone languages do not usually mark given elements for relative prominence; there is no accented/non-accented distinction. There are examples of systems in which every TBU carries distinctive tone, but certain tones or patterns are only possible in accented positions; these systems represent a hybrid of tone and pitch accent.

In reality, the ideal tone language described above is so rare as to be virtually non-existent. In almost all tone languages, only a proper subset of all possible tone-bearing units are actually able to show tonal distinctions. In some cases, tonal contrast is neutralized, in whole or in part, in some positions within a word. In other cases, a number of morphemes have no inherent tonal features, and acquire them in predictable ways from other elements in the phonological domain. The distinguishing characteristic of tone as opposed to pitch accent is therefore less clear-cut, though the 'tone' end of the continuum is still marked by a universal surface attachment of tonal elements to each TBU.

Tone languages are also distinguished by their use of multiple tone levels. All pitch-accent systems to my knowledge make use of a binary option in possible pitch

assignments in their underlying description, corresponding to the opposition Accented/Unaccented.²⁸ Beyond the word level, of course, many pitch levels are used in the intonation systems of languages, but only tone languages make use of multiple levels within the word.

We may make use of the bifurcation of tonal systems into "register" and "contour" types, familiar from Pike (1948). True register systems, in which there is a one-to-one match underlyingly between tones and TBU's are quite rare; Mixtec provides one of the best examples ((Pike (1948))); other examples include Navaho (Young and Morgan (1980)) and Kiowa (Watkins (1984)). Much more common are systems allowing multiple tones to be assigned to a TBU, producing contour tones. Most systems allow at most two tones per TBU, though three-tone patterns are not unknown (e.g., the Mandarin third tone before pause, with a Fall-Rise pattern). There is no known system making use only of contour tones.²⁹

In the languages mentioned so far, tone is part of the lexical entry of a given morpheme, and each morpheme surfaces with its underlying tone (if any) in place (subject to

²⁸On the surface, of course, further distinctions are possible. The most common type occurs with long vowels (or long syllabic nuclei) in systems in which the mora is the tone-bearing unit. In such cases, we find an opposition between acute (first mora) and circumflex (second mora) High pitch. Such cases still make use only of a binary pitch-level contrast, however.

²⁹Among tone languages; many pitch-accent systems, including Japanese and Vedic, have a contour as their (only) accent mark.

simplification and sandhi rules in most cases). We may term such systems inherent tone languages. Closely related are cases in which a given morpheme has an underlying tone, but assigns it to a TBU which is adjacent on the surface. In Kikuyu (Clements 1984), for example, the tones carried by each morpheme appear on the surface one syllable to the right of their underlying positions.³⁰ Some systems, such as Rimi (Olsen 1964) show a mixed pattern, with some High tones surfacing in their underlying position, while others shift one syllable to the right; this distinction appears to be based on historical vowel length (see Goldsmith (1988) for a survey of such patterns in Bantu). These systems show interesting parallels to certain types of pitch accent, where 'pre-accenting' and 'post-accenting' elements are often found.

In contrast to such inherent tone systems, we also find a large number of cases in which tone is not pre-attached to individual elements within the morphology or phonology, but instead is assigned to a phonological domain as a whole. In these cases, a sequence of tones is associated with a sequence of TBU's according to a given set of principles; we may call such systems melodic tone languages. Each TBU still receives distinctive pitch, but it is the pattern of tones

³⁰The treatment of the initial and final syllables is handled according to the universal principles assumed by autosegmental descriptions (see below). This is a radically simplified description of the Kikuyu situation, which involves many more conditions than given here.

and not the individual tones themselves that is significant. It is entirely possible for a tone language to involve both pre-associated tones and melodies associated with larger domains.

If we move away from the 'pure' end of the tone language scale, we find a large number of languages which have restrictions on the possible tonal patterns, and/or on positions within the word which may show tonal contrasts. It is often difficult at this point to draw a clear line between such 'restricted tone languages' and some types of pitch accent.

Of the major types of prosodic systems, only the origin of tone has been adequately investigated. As has been shown in a number of cases (the papers in Hyman (1973); Hombert 1975), phonemic tone most often arises from consonantal perturbations of the fundamental frequency of adjacent vowels, followed by the loss of the consonants. These studies give us a valuable insight to the actual creation of a prosodic system, rather than just of changes within a pre-existing type.

As a whole, tonal systems are the least intrusive in causing segmental changes. Not unexpectedly, we do not find the kinds of syncope or vocalic quantity changes associated with accentual systems. More importantly, there are no means (at least in the purer type of tonal system) to mark a phonological 'peak' or prominence, since all tones are considered equal. As we will see, this segmental neutrality

of tonal features provides ample room for the development of a more or less distinct second prosodic system with such a language, a change with a number of diachronic implications.

2.3.3 Pitch accent

As we move along the continuum from pure tone systems to restricted tone to pitch accent, we are not changing the surface realization of prosodic features. The change comes in the degree of homogeneity in the treatment of potential tone-bearing units. From a system which treats all elements equally, we can shift to a system in which the egalitarian assignment of tonal features is restricted to some subset of the phonological domain, and finally to a system in which one (or at least a minority) of the possible TBU's receives a tone, while the remainder must do without. At this stage, the types of prominence contrasts associated with accent systems are now possible, and we have entered the realm of pitch accent.

A more specific distinction between true pitch accent and tonal systems comes in the degree of marking necessary to predict the surface tonal melody. In a pitch accent system, one must know only the location of the underlying accents in order to fill in all of the surface tone features. In this regard, even extremely limited tonal systems, such as found in the High dialect of Runyankore, are clearly distinct from pitch accent (see Chapter Six).

Pitch accent generally does not show the degree of tone sandhi found in more complete tonal systems, nor does it have

the effects of accent subordination or clash found in stress systems. Instead, we find the very common rule of accent deletion, which removes all of the underlying accents of a word except for a small number. The surviving accent(s) generally are found at one or the other margin of a domain, that is, it is generally the first or last accent that causes the deletion. Examples of such rules can be found in Japanese and in some languages of the Niger-Congo group, in which the leftmost accent survives; a more complex deletion rule occurs in Vedic (and, it can be argued, for Indo-European), in which morphological factors determine which accent survives (though generally the first has prominence).

Within pitch accent systems, we find a division based on the presence or absence of underlying accent in morphemes. In cases such as Vedic or Japanese, each individual morpheme must be marked as underlyingly accented or unaccented³¹. This can be termed inherent pitch accent, and generally has little to no effect on the segmental phonology (as exemplified by the two cases just given). An alternative sub-type of pitch accent assigns surface accent to TBU's by some rule, either by position within the phonological word,

³¹Such inherent marking need not be specifically "accentual" in nature, i.e., it need not specify [+accent] or use the autosegmental asterisk notation. It may simply consist of a pre-attached tone or tonal melody. The systems of Tokyo Japanese and Vedic, though similar in many respects, differ in this regard. In Japanese, one can deal with tone directly, while in Vedic an intermediate accentual level is needed before tone is assigned within a phonological word.

or based on some necessary feature (vowel length, syllable weight, etc.), or through a combination of the two. This may be termed metrical pitch accent, since it can most easily be described using the formalisms of metrical phonology.

In contrast to inherent accent, metrical accent often shows many of the same segmental effects as does stress accent. As we will see in section 2.4, this overlap points to a similar underlying structure for such accentual systems. Unlike most stress systems, however, pitch accent generally does not require the exhaustive association of metrical structure within a domain. In other words, while stress languages universally require at least one stressed element within a phonological word, and often have degrees of stress marked throughout the word, pitch accent languages normally do not require the presence of a pitch prominence within any given domain³², and need not continue oppositions of pitch throughout the word.

Most interesting for the purposes of this study are the pitch accent systems that combine features of these two types. In such systems, the location of pitch accent is not predictable purely by phonological means; it must be marked as an underlying feature of at least some morphemes. Yet, at the same time, there are clear indications of some type of phonological conditioning of the placement of the surface

³²Classical Greek is, of course, a marked exception to this; see section 3.4 for a discussion of the Greek requirements for pitch accent within words.

accent. One clear example of such a mixed system is found in Classical Greek, in which the accent of nouns cannot be predicted on phonological grounds alone, but is limited by the quantity-sensitive "three-syllable rule". In verbal accentuation, inherent accent appears to have been entirely lost, and accent is assigned in a predictable manner.

Another such system can be found in Dakota (Boas and Deloria 1936), in which pitch accent again is not entirely predictable. Here, the accent is limited to the first or second syllable, and generally falls on the stem-final syllable (all stems are mono- or bi-syllabic). This type of restriction is typical of metrical accent, yet there are too many exceptions to this rule to reduce the accent to non-phonemic status. These types of systems can be termed restricted inherent accent, and will be seen to play an important role in historical change.

2.3.4 Stress accent

When dealing with tone, we can be fairly confident in our understanding of the phonetic basis of our phonological features: tone (and pitch) is related to F_0 and can be measured in concrete ways. Of course, it has long been known that speakers of tone languages are sensitive not to absolute distinctions of pitch, but to the relative pitches within a tone system. Still, we at least have an agreed-upon definition of the term.

When we turn to stress, however, we find it much more difficult to establish a consistent working description. The

problems involved can be illustrated from one of the more recently proposed definitions. Beckman (1986) has defined a stress accent as one "differ[ing] from non-stress accent in that it uses to a greater extent material other than pitch." This negative definition is made necessary by the fact that almost no positive feature can universally be assigned to the range of phenomena we would like to call stress. Such factors as loudness (or amplitude), increased force of expiration, "emphasis" (with intentional vagueness), and increased duration have been mentioned, and often can be found as components of stress, but none appear to be crucial to its definition. In general, we may safely understand stress accent as one which involves a complex of pulmonic and pitch features which are perceived by the listener as a marker of phonological prominence. For the purposes of this study, it is not so much the phonetic realization of stress that is crucial, but the typical phonological correlates that are related to it.

Within a prosodic system marked by stress, a number of such typical features can be found. First, such systems are unique in usually having a number of prominent elements within a given domain; this contrasts with the majority of pitch accent systems that show one accent per word, and with tone languages, in which no element is prominent. Even those pitch accent systems that show more than one accent usually have some set maximum number. Stress accent, on the other hand, is generally unlimited; any number of syllables in an

English word, for instance, can bear some degree of stress.³³

Second, stress accents are hierarchical; primary stress on one element generally prohibits another primary stress on any other element in that domain, but weaker stresses are common. This contrasts again both with pitch accent, which is an all or nothing affair, and with tone.³⁴ The actual levels of possible stress are language specific, though at least three levels of stress, plus lack of stress, must be accepted.

Third, stress is the most likely accentual type to affect segmental elements. Its presence can trigger vowel lengthening or change in quality, resistance to contraction, and a variety of other processes. In a similar way, the absence of stress often leads to vocalic neutralization, reduction or deletion. While some cases of pitch accent have similar effects (mainly those cases that share a similar metrical structure with stress systems), the likelihood of such changes is much greater in clear stress-accent systems.

Languages making use of stress can be divided into those with phonemic stress and those with predictable stress.

³³Because of the subordinating nature of stress, there is of course a practical limit to perceivable stress, yet the underlying pattern remains unrestricted. Systems with no secondary stresses, such as Russian, are often the result of the development of stress as a replacement for an older non-stress accent (see below).

³⁴ Stress subordination should not be confused with tonal downstep, which is an entirely separate and unrelated process.

Within the predictable systems, the accent can either be fixed or predictable on the basis of segmental patterns. These differences can be termed inherent stress accent and metrical stress accent, in parallel to the terms used for tone and pitch.

As mentioned, stress systems and pitch accent systems pattern together in an extremely important way when compared to tonal systems. In both of the former types, one or more elements within an otherwise equal string of segments receive special suprasegmental features: extra amplitude, duration, higher pitch, etc. Thus, there is a prominence relation between the members of such a phonological domain. In tonal systems, at least of the purer types, all elements bear the same type of pitch marker. While the specific tonal elements mapped onto given segments will vary, all elements are 'equal' from the point of view of the prosodic system. There is no tonal hierarchy parallel to the stress-subordination and accent-deletion rules that we have seen above.³⁵

Tonal and pitch-accent systems share the manner of suprasegmental marking, making use of a change in fundamental frequency instead of (or, at least, as a more salient component than) the complex of articulatory features that

³⁵This is not to ignore the various types of interactions which can occur between adjacent tones in languages such as Chinese. In these cases, however, the tone sandhi processes leave the segmental elements with an equal status, so to speak. One cannot pick out one syllable of a Chinese word purely on tonal criteria and say, "This is the prosodic peak", as one can in stress and pitch-accent systems.

make up stress. It seems clear, then, that pitch accent in its various forms stands as an intermediate system combining features of tone and stress.

Assume that tonal prosodic systems associate tonal features to elements in the segmental string through standard autosegmental means. In pitch accent systems, tonal features are not spread evenly across all potential TBU's. Instead, pitch marks phonological prominence on one or more highlight elements. These elements can be assigned their special status in one of two ways: either they are already marked as accented in their lexical entries (inherent accent), or they can receive accent by the regular application of a rule of prominence assignment (metrical accent). It is one of the claims of this paper that the second type, in which tone is mapped onto the prominent positions of a metrical grid, is a common step in the evolution of prosodic systems from stress to tone and vice versa. As we will see, many of the developments in the history of IE prosody can be understood as the loss of inherent accent in morphemes, and the transfer of the older pitch-accents to syllables which are prominent phonologically rather than morphologically.³⁶

Thus, across the three-way typology lies a more basic two-way split, accenting vs. non-accenting languages.

³⁶The mapping of pitch-accent to metrical prominence has been suggested by Goldsmith (1987), Wilson (1987), and others (see especially the selections in van der Hulst and Smith (1988)).

Formally, the accenting types are those in which metrical structure is relevant for the assigning of lexical accent (as we will see, it can have other uses); non-accenting languages make no use of metrical prominence for this purpose (though they may for others). This distinction will be relevant for the IE data.

Between the types of accenting languages, stress is further set apart from the wide range of possible pitch accent systems by its domain of realization. While a tone or pitch accent can be associated with either an entire syllable or a single mora of that syllable, there is only one possibility for stress. It must be associated with a syllable. In general, all other things being equal, stress systems tend to assign stress to longer or heavier syllables; we will discuss later how this falls out of a formal metrical analysis.

2.4 A Typology of Historical Prosody

If we accept the usefulness of metrical and autosegmental models for the description of prosodic features, we can then inquire if such models have any value in the diachronic study of prosodic change. We can give a positive answer only if the constraints and structures incorporated into our formalisms turn out to actually play a role in attested cases of prosodic shift.

In this section, I suggest a number of general principles of diachronic prosody presented within such a formal framework. With each principle are given one or more

examples that illustrate the application of metrical and autosegmental theory to the relevant data. Before this, however, we should ask number of questions of a more general nature.

Beginning with metrical theory, we must consider what sort of predictions such a theory would make concerning possible types of diachronic change. Since metrical theory establishes a number of parameters for the description of synchronic systems, we would expect these concepts to be applicable to diachronic change as well.

A partial list of changes which would be consistent with a metrical framework of prosodic features would include:

- A) Changes in foot construction rules. These could include such variables as bounded/unbounded feet, default left/right strength assignment, quantity sensitivity, and iteration of foot construction.
- B) Changes affecting the word tree. The primary parameter here is directionality.
- C) Changes in assignment of extrametricality.
- D) Changes in the units relevant for structure building: morae, vowels, sonorants, nuclei, rimes, codas, etc.
- E) Changes in the overall domain of metrical structure.

To see what kind of observable effects these changes might entail, we might take a few actual prosodic systems as examples. If we start with a fairly simple metrical stress rule, such as that of Classical Latin, we can see that some of the proposed changes immediately strike us as more plausible than others. If Latin were to lose the extrametricality of the last syllable, for instance, Latin stress would simply shift rightward, with its actual position

determined by the weight of the ultima rather than the penult. This result would seem reasonable, given the close resemblance it has, at least in broad outline, to the system of Classical Greek. Or, if the definition of a heavy syllable were to change, so that vowels could no longer be long by position, we would certainly have a strikingly different set of stress facts for Latin (not to mention the effects on poetry), but the system would still seem entirely plausible; in fact, a number of examples of languages with this exact rule could be made.

If, on the other hand, Latin were to change the strength assignment with the metrical foot so that the penult were weak if and only if it were heavy, we would immediately sense something strange about the resulting system. Likewise, if extrametricality were extended to include the final three syllables, the resulting system would be highly unlikely. Thus, we need a typology of reasonable and unreasonable systems to help us weigh the likelihood of the possible changes of metrical parameters if we are to judge the actual predictive power of metrical theory as a whole.

Here, our overall understanding of phonological prominence is useful. Following the definition given above, it would seem unlikely that two rules, both dealing with the salience of an element, would work at cross-purposes. Thus, a metrical system which is sensitive to syllable weight, itself a marker of salience, is unlikely to assign metrical strength to the lesser marked member of the weight hierarchy.

In the same way, while the metrical system and the tonal system of a language may be almost entirely separate, we would still expect that diachronic changes would tend to create greater overlap of prominence assignment rather than lesser, assuming no major changes in other areas of the phonology which made this impossible. The point may seem obvious, but it needs to be established as we move on to look at the often complicated pattern of diachronic change which these systems undergo.³⁷

Because of the atomistic nature of the phenomena described, autosegmental theory by itself entails a much smaller set of possible diachronic developments. Clearly, the primary focus of such a theory would be the options for re-association of elements on distinct autosegmental tiers. Because of the well-formedness conditions inherent in any constrained theory of this type, we can rule out the crossing of association lines as a possible historical change. Beyond this relatively uninteresting principle, an autosegmental model would allow the following formal descriptions of

³⁷In fact, we do find cases in which "prominence" rules appear to bleed each other, but there is generally some historical explanation for this. As we will see in section three of the next chapter, the jer-deletion rule of Russian often deleted the accented segment of a word. However, since it appears that the accent in this stage of the language was a pitch accent assigned on purely morphological grounds, there was not direct clash between the metrical structure governing jer deletion and the accent itself. In such cases, the accent survives, and even shifts in direct accord with the metrical structure. Still, such cases should be quite rare under the assumptions made here.

alterations in prosodic systems:

- a) Changes in the actual autosegments of the melodic tier;
- b) Changes in the units eligible for melodic association;
- c) Changes in the direction of melodic spread;
- d) Shifts between inherent and metrical melody assignment;
- e) Introduction or deletion of floating autosegments;
- f) Changes in the domain of an autosegmental rule;
- g) The acquisition or loss of diacritic accents;

The change listed under (a) is, of course, not in reality a change in the systematic rules within the tonal system, but simply a change of the relevant markers of assignment within the system. This type of change is quite common, often involving a change in the tonal inventory of a language.

The remaining list of changes involves shifts within the system of association rules itself. If the units on the skeletal tier which are available for melodic mapping are reanalyzed, as in (b), we would have such distinctions as mora vs. syllable as the domain for tone assignment, or whether sonorants are eligible for association with accents (observe the contrasts between, e.g., Lithuanian and Greek in this regard). We may also find a systematic exclusion of previously relevant units from the domain of rules, as I argue has occurred with High vowels in certain positions for accent assignment in Vedic (see Chapter Four).

Type (c), the change of direction in melodic spread, turns out, I believe, to be quite unusual as a spontaneous change. This appears to be related to a marked preference in the world's languages for the rightward spread of tone

(Hyman and Schuh (1974)). Change of type (d), on the other hand, appears to be the source of many typological shifts within the history of certain languages, and many of the examples of this study will illustrate this change. Types (e-g) are predicted as possible developments within the theory, but I have no clear examples of their actual presence in any of the cases I have examined.³⁸

The proposals of our two models are thus quite broad in some respects, while severely limited in others. Further research specifically on the typology of possible prosodic systems would be expected to be able to more adequately limit metrical and autosegmental theory; but one study at a time.

We are now in the position to state our first principle:

A. Directionality: prosodic systems are most likely to change in a manner which eliminates conflict and/or maximizes agreement between prominence assignment rules.

This may be seen as the prosodic equivalent to the familiar rules of assimilation and paradigmatic leveling. In all such cases, a language changes to bring more regularity to a given system. In this case, there is a great likelihood that, all other things being equal, competing prominence systems will become unified through the subordination of one

³⁸Though there may be hints of changes in floating tones and development of inherent accents in Japanese, discussed in Chapter Six.

system to another.³⁹

An extremely common example of this is the limitation of tone assignment based on metrical prominence, as we have already mentioned in our discussion of metrical pitch accent. In these cases, there are two competing markers of phonological prominence within the prosodic system: a tonal element (most often a High or Falling tone) and a metrical peak (most often the location of lexical accent). While a number of languages show that such parallel prosodies can be maintained entirely or largely independent, we have a good number of examples in which changes have occurred to prevent prominence clashes between the different systems.

Goldsmith, in a number of publications, has shown that some of these cases involve the "docking" of previous free tonal units onto the strong positions within a metrical grid (Goldsmith 1987, 1988). One such example is the case KiRundi, in which High tones are consistently shifted one mora to the right or left in order to align them with the odd-numbered morae counting from after the Tense-Focus marker; here the influence of an underlying metrical patterns can be seen. In the closely related Kinyarwanda, a High tone spreads leftwards onto alternating syllables through the first vowel of the stem. In a more ordinary tonal situation,

³⁹I am not discussing here the more familiar types of change in which irregularities of accentual placement in comparison to some dominant paradigm are levelled; these cases are simply extensions of the universal phonological pressure for regularity to a particular prosodic element.

we would expect an unbroken tonal sequence as the consequence of spread; here the alternating pattern points to an underlying metrical grid.

While good examples of change in the opposite direction are harder to find, I would suggest that we can see partial changes in such languages as Classical Greek and Serbo-Croatian. In these languages, an inherited pitch accent has not been completely dominated by the metrical system, but has been severely limited by it. Greek will be discussed more fully in Chapter Three, and Serbo-Croatian in Chapter Five. I will also suggest in Chapter Three that the history of Latin may present a fuller development, from free pitch accent, to restricted pitch accent limited by metrical prominence relationships, to metrical stress (cf. Russian for a similar development).

Even if the metrical system involved in such a change does not make use of stress, there must still be some sort of surface marking of the strong-weak distinction in order for learners to acquire the proper rules for its development. It is an open question as to the variety of ways in which metrical prominence is marked. I have suggested that within some types of systems, it can be marked negatively, as a resistance to syncope, contraction, or other such rules. Of course, within the historical analysis, it may be found that such "stressless" prosodies are the remains of an older accentual system which has for various reasons been replaced by a more recent version (as was suggested for

Passamaquoddy). Of course, if tonal assignment is consistent with a metrical grid, it may act in itself as the surface marker, allowing the learning of the pattern (as in Kirundi, above).

The collapsing of separate prosodic systems is even more likely if the segmental conditions governing one system or the other begin to break down. In Classical Greek, the free placement of pitch accent assumed for Indo-European has been restricted by metrical structure. The most likely explanation for this, given the small number of IE languages which successfully maintained the older system, is that the complex morphological interactions which originally determined accent placement were weakening under the influence of a variety of phonological shifts occurring within Greek. With this weakening came an increased reliance on the metrical patterns of Greek to determine prominence, and an eventual limitation on accent to within the domain of the metrical structure (see Chapter Four for a fuller account).

B. Rules assigning underlying prosodic prominence are independent of the surface marker of that prominence.

There are a number of cases of an accentual system maintaining its rules while the actual phonological features of the marker of accent change, sometimes dramatically. Russian presents one clear example of such a change: while keeping the broad outlines of the IE free accent system, it has changed from pitch accent (assumed for both IE and Common Slavic) to a strong stress accent, accompanied by the vowel

reduction facts often accompanying such a system. This pattern of change sets Russian apart both from other Slavic languages with predictable stress (e.g. Polish and Czech) and those with phonemic pitch accent (e.g. Serbo-Croatian and Slovenian).

A different type of example is offered by Heiltsuq, a Wakashan language spoken in British Columbia (which will be covered in considerable detail in Chapter Four). While all of the related languages of the area have predictable stress-accent systems, Heiltsuq has a clearly phonemic pitch-accent. If the systems are compared, it can be seen that the basis of the Heiltsuq system must have at one time been the reconstructed stress system of Proto-Wakashan. Here the original stresses have been replaced by tonal features.

Within the Bantu family of languages, there are a number of examples showing the lingering effects of a metrical prominence which has lost all direct accentual marking. Common Bantu (or, at least, Eastern Bantu) is generally reconstructed with a regular penultimate stress as well as a tonal prosody. In languages such as Haya, Chagga, and Runyankore, we find unusual tonal distributions or other features which point to extra prominence on the penult. In Haya, tones shift to move onto the penult from the final syllable; in Chagga, a regular rule of syncope applies only to vowels in syllables before the penult; and in Runyankore, tonal distinctions have been lost except on the penultimate syllable. In none of these languages has stress itself

survived.

It is extremely difficult to detect such a change within the history of a tone language unless careful records exist of the older stages of the language. Chinese is the most likely source for such a source of information, but I have not found data to substantiate such regular tonal shifts within the small amount of Chinese material I have examined. The nature of the systems involved make it unlikely that a tone language should replace its variety of tones with, say, stress accents in a regular correspondence, so that it is not surprising that such a change is, to my knowledge, unattested.

C. Typologically unexpected features within a prosodic system can be relics of an older stage of the prosodic system.

Again, this principle is simply the reflection within the prosodic phonology of the general principle that one reconstructs on the basis of exceptions. When a language changes from tone to pitch accent, pitch accent to stress, or other such major typological shift, it is often the case that features most commonly associated with the older type of system survive into the newer system. These anomalous cases are crucial for the reconstruction of historical prosodic systems, much as archaisms in segmental phonology or any other area would be.

If we return to Russian for a moment, we can see an example of this type of evidence. Given that the modern

Russian accent is a strong expiratory stress, as mentioned above, we would not expect syllable adjacent to the place of accent to share in the phonological strength indicated by the presence of stress. This is based on the "Perfect Grid" observation, that stress systems have a general tendency for alternation of strength. Thus, the syllable before the stress would be expected to be weak, and, if analogies with other similar systems are correct, should be one of the most likely loci for such processes as syncope or vowel reduction.

In fact, however, the "pretonic" syllable in Russian shares with the accented syllable a resistance to the marked vowel reduction found in all other non-initial syllables. While this resistance is not perfect, it is a definite sign of some degree of prosodic strength extending to the vowel of this syllable. Such a spreading of prominence would be more usual within a system of tonal features, especially a pitch-accent system, rather than a stress system. As we have mentioned, the Russian system appears clearly to have evolved in a rather direct way from an older pitch-accent system. It may be that this feature of strength on the pretonic syllable is a relic of the older pitch accent, in which case it is not as typologically exceptional as it may first appear.⁴⁰

⁴⁰The fact that this spread occurs to the left rather than the right can also be explained by reference to features of the older Russian prosodic system, specifically to a metrical structure motivated by a syncope rule and a pattern of vocalic lengthening similar in some ways to the process of compensatory lengthening. The arguments for the relevant history are too long to give here, but will be discussed in Chapter Four.

A second example comes from a puzzling fact in the history of Latin accentology, which will be presented in fuller detail in the next chapter. Arguments have long centered on the questions involving the pre-historic accentual pattern of Latin, and the Italic family as a whole. Of primary interest was an extensive process of syncope shared in some degree by all of the major languages of the family. The evidence has generally been interpreted to be a strong motivation for the presence of an initial stress accent at this stage of the language.

What is somewhat surprising is the relative lack of syncope which appears to be caused by the historical Latin accent, which is also assumed to have been stress. Few cases of syncope must be unarguably related to the penult/antepenult placement of accent. I will argue that, while the prehistoric syncope is an indicator of a metrical pattern (though not necessarily stress), the Classical Latin accent was, for some considerable length of time, a continuation of the inherited Indo-European pitch accent; as such, we would not expect to find the same degree of syncope or other segmental effects associated with it as would be found with a true stress accent. By the period of Romance, however, a stress accent had clearly developed, leading to the common occurrence of syncope in later forms.

A final example of this principle comes from Heiltsuq, the Wakashan language which we have mentioned several times. Here, it is not the effect of the accent on the segmental

phonology which is unusual, but rather the segmental features which effect the accent. Heiltsuq has an apparently free pitch accent, and examples can be found with accent placed on any available syllable within a word. When we compare Heiltsuq to the most closely related languages within its family, however, a number of important correspondences become visible. Primary among them is that the syllable-weight and vocalic quality conditions which still determine the position of stress in a number of Wakashan languages appear to be relevant for determining final accent placement in Heiltsuq as well. It would be extremely unusual for such a free pitch-accent system to have such conditions in isolation, but in this case they clearly indicate the evolution of the Heiltsuq system from a stress pattern similar to that found in the rest of the family (see Chapter Four).

D. When prosodic structures or elements are restricted to a subdomain within the phonological word, they survive at the margin of the word which served as the starting point for the original rule of application.

One of the more interesting changes in prosodic systems, which we will find several times in the examples of the next three chapters, is the loss of iteration in a rule constructing metrical feet as part of a larger accentual rule. The result of this loss of iteration is always to leave a single foot constructed at one margin of the phonological word, and always at the margin from which the original rule began its application across the word. It

would appear that such a change does not alter the parameters of headedness or directionality in the foot construction rules, but only eliminates the repetitive quality of the rule itself.

It might be argued that the relevant characteristic in this change is that only the foot containing the most dominant element, such as the primary stress, survives. This appears to be correct in a number of examples, such as Nootka and, perhaps, Japanese, but is less clear for Slavic and Latin. In Russian, the metrical structure undergoing loss of iteration is independent of the accentual system, which was and remains based on morphological rather than phonological conditions. Since the metrical structure itself does not appear to have any internal hierarchy, it is impossible to determine what the "primary element" would be in this case.⁴¹ In the Latin case, there is good reason to believe that the surviving foot is not in fact the strong piece of the metrical structure, but simply the first built foot in the iterating portion of a more complicated pattern.

⁴¹Halle and Vergnaud have employed the term tier conflation to describe cases in which the metrical structure either eliminates all dominance relations above the foot level or below the highest level. This allows metrical feet to serve simply as counting devices, and also prevents the overgeneration of secondary stresses in a number of cases. The metrical structure which I assume for Russian is a perfect case for tier conflation, but I have serious doubts if such a process is really demanded by the theory at all. I would prefer to assume that metrical structure is flexible enough to be able to stop at certain points without requiring a separate process to flatten out the grid.

If such a change occurred within a metrical structure and, at the same time, a previous free accent was becoming sensitive to metrical prominence, it should be possible to find a quasi-free accent limited to a range of positions within the now single metrical foot of a word. I will argue that this is exactly the situation which we find in Greek and a number of other similar systems. In these cases, the restricted metrical structure has penned in the accent, creating a subdomain such as the "Three-syllable Rule" of Greek. Japanese, I believe, has undergone a related but more complex change, in which the accent is still free, but the interpretation of the overall lexical melody has become restricted by a reduced metrical foot structure.

E. Extrametricality is most often the synchronic regularization of a marginal position incapable of acting as the head of a full metrical foot within the older prosodic system.

Prosodic systems which make use of binary foot structures often produce positions within the phonological string for which the relative strength is predictable. We have seen in the example of Passamaquoddy that the initial syllable of a word will always be considered "strong" regardless of the number of syllables in a word. In the same way, if a language builds quantity-insensitive right headed binary feet within a word from right to left, it is clear that the final syllable of all words will be weak.

In other cases, especially those with quantity-sensitive

feet, it is impossible to make such universal statements of strength. Often, however, we can make a weaker prediction for marginal elements, namely, that they will never act as the head of a full metrical foot.⁴² It would appear that a number of cases of extrametricality may have developed from such elements.

If we take a preview of the arguments concerning the history of Latin accent, we can look at that language as a case in point. The metrical structure needed to account for syncope in Early Latin, Oscan, and Umbrian does not mark the final syllable as extrametrical. If, as I would argue, the Classical Latin accent rule is a direct development out of this earlier metrical structure, we will need to explain the extrametrical status of the final syllable in the Classical Period. The most likely origin is in the treatment of the final syllables in the earlier system. Given the rules suggested (see Chapter Three), final syllables in Common Italic/Early Latin would either be in weak positions, or be degenerate (single-member) feet, depending on syllable weight. In no case would such a syllable act as the head of a binary foot.

I will argue that the lack of a full range of roles in

⁴²It might seem to go without saying that the last syllable of a word cannot be the head of a metrical foot in a system which constructs right-headed feet, but this is not always the case. There are a number of examples which have been analyzed as assigning headedness within a foot based on syllable weight; thus a heavy ultima would be a head in such systems.

the metrical structure, combined with the general phonological and phonetic weakness of final syllables, led to the re-analysis of the ultima as outside the metrical grid, causing the primary accent to fall on the penult or antepenult as expected.⁴³

A similar pattern has been suggested for Classical Greek by Steriade (1988), though the situation here is more complex. Setting aside the proposed extrametricality of final segments (the more controversial part of her proposal), we can account for predictable patterns of Greek accent (i.e. recessive accent) in part by assuming the extrametricality of light final syllables only. This would have a direct motivating condition within the older metrical structure if we assume that Greek began with an alternating binary foot system largely identical to that proposed for Italic. In this case, a light ultima would consistently be in a weak metrical position, and thus be eligible for re-analysis in terms of extrametricality.⁴⁴

2.5 Conclusions

⁴³At the same time, such a system would count the initial syllables of all words as strong, much as in the Passamaquoddy example; this would appear to be the cause of the lack of syncope in initial syllables, as well as the other phenomena which have led scholars in general to assume the existence of strong initial stress at this stage of Italic.

⁴⁴Welsh, I believe, has undergone a similar process at a fairly early stage in its development, but the loss of original final syllables makes the situation less convincing. See Chapter Six for a brief discussion of the Welsh facts.

While a good number of examples showing some of the possible routes of diachronic change in prosodic systems have been presented so far in this chapter, we have been able to talk considerably less concerning the motivating factors for such change. Unfortunately, such factors are as little understood as the causes of historical change in general. We should, however, review what we do know.

It is clear that changes within the segmental phonology can lead to the collapse and subsequent reanalysis of a prosodic system. One of the most common examples of this is the neutralization of phonemic vowel length and its effects on metrical structure. In cases as divergent as Romance and Wakashan, the loss of vowel length distinctions have led to major changes in the rules governing stress placement. Within Romance, the older quantity-sensitive stress rule of Latin could not survive such a change⁴⁵, and was replaced with a variety of newer systems with varying degrees of predictability (with French and Romanian marking the extreme examples). Within Wakashan, the loss of quantity in Heiltsuq led to the total collapse of predictable accent and the rise of a phonemic prosody.

Such changes have been discussed within the older approaches to historical change, since they their results do

⁴⁵Though see Pulgram (1975) for an alternative view, arguing that non-literary Latin may not have had phonemic quantity at any stage; while his argument on this point appears unconvincing, many important issues are raised in the discussion.

not create a general typological shift in the accentual system itself. It is the major changes between the major types of prosodic systems that are the least understood, and the most interesting. Such changes may, it appears, be the result of language contact of various types, or arise through purely internal causes.

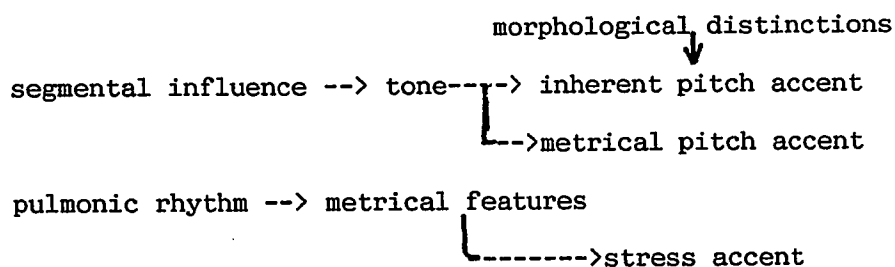
How can external influence effect prosodic change? We have a number of examples of such cases that help us formulate an answer. First, speakers may be exposed to new ways to indicate accented elements, or lose the accented distinction itself. In the example studied by Li (1987), contact between speakers of Chinese and Mongol led to the borrowing of prosodic features in both directions. The Mongol speakers have acquired phonemic tone distinctions, while the Chinese speakers appear to be in the process of losing tonal distinctions, and replacing them with predictable stress accents. Here, there has been a virtual trade of the original prosodic systems.

A similar example has occurred, in a more limited fashion, in some cases of pidginization. In Hawaiian Pidgin English (actually a creole at this stage), the use of pitch over stress as a marker of accent is common for many speakers. Within the Japanese-based sub-dialect of the pidgin, for example, speakers often use a falling contour tone to replace stress in a number of situations. This mirrors the role of the fall of pitch as the marker of lexical accent in Japanese. In this case, however, the

placement of accent in the vocabulary, even in the non-English lexical items incorporated into the pidgin (from such diverse sources as Chinese, Hawaiian, and Portuguese) follows the standard English rules. Thus, the English accentual system remains untouched underlyingly, while the surface realization has been altered (similar to the examples above).

Salmons (1989) has argued that the rise of initial accent in the major Indo-European languages in Western Europe (Germanic, Italic, and Celtic) may be the result of language contact, primarily with Finno-Ugric languages. The parallels which he presents are certainly one type of motivating factor for such a change, but I will suggest that there already existed within IE, even at the earliest reconstructable era, a strong tendency for emphasis on the initial syllable (as seen in the accentual rules, rhythmic patterns in the oldest languages, etc.). Thus, the rise of fixed initial stress in these cases may be seen as a result of both internal and external forces at work in the later stages of the IE unity.

We have seen in the principles given above possible origins of the major typological categories of prosodic systems; these can be summarized in the chart below:



Pure tone systems appear to arise primarily because of

the influence of consonants on adjacent vowels. With the loss or neutralization of these consonants, these tonal distinctions can be phonemicized. At the same time, the universal pulmonic push towards a speech rhythm may be sufficiently salient to become part of the overall prosody. If it is dominant, and pitch features are thoroughly subordinated to the expiratory complex marking rhythmic peaks (i.e. metrical prominences), the system will be consistent with the label of stress accent. If instead, the rise of tonal contrasts massively outweighs the rhythmic features, we can term the result a tonal system. If the tonal elements present in such a system become bound to particular elements due to morphological or other phonemic conditions, the result will be an inherent pitch-accent system.

The existence within a language of both subsystems, tonal and metrical, can lead to several attested results. Both can be maintained as independent systems, with little or no interplay. This appears to be the case in some dialects of Chinese, and would be reconstructed for Common Slavic and perhaps Proto-Bantu (though Goldsmith (1988) does not see any reason for metrical structure at so early a date). In such double systems, one feature appears to always be the lexical accentual marker, while the other plays a subsidiary, often non-phonemic role.

If, on the other hand, the two systems interact, metrical pitch accent can be the result. The examples here have already been discussed. What should be emphasized is

that this patterning represents a merger of the most prominent elements within the originally separate prosodic domains, leading to both a simplification and, in some ways, an impoverishment of the overall suprasegmental inventory.

It would certainly be possible for the results in such a case of interaction between systems to be different. If instead of the tonal elements becoming dependent on metrical structure, the metrical peaks were brought into line with already existing tonal prominences (generally High or contour tones), the result could be inherent rather than metrical pitch accent. This would involve the loss of the regular alternation (Perfect Grid) considered to be the unmarked condition of metrical patterns, and the morphologization of the features marking metrical prominence within a given language. While I know of no clear examples of such a development, it cannot be excluded from the realm of possibility.⁴⁶

Finally, we can see that stress accent, the most common marker of metrical prominence, is also the most likely type of prosodic feature to cause many of the segmental changes that can lead to the development of phonemic tone. Thus, the pattern of diachronic change is not necessarily linear, but can be viewed as circular. Assuming a language with a fairly rich segmental and syllabic phonology, and the absence of

⁴⁶This development should not be confused with the more common evolution of tone systems into inherent pitch accent without the direct interference of metrical systems, as occurred in Japanese and Korean.

enforced external influences (either borrowing or pidginization), we might expect to find a continuous rise and fall of the typologically distinct prosodic systems. Such changes, if the examples that can be examined are typical, occur over lengthy periods of time. Their relation to other parallel cycles, such as those suggested by Cowgill (1966) and others for morphological complexity, or for word-order patterns, is an interesting question beyond the scope of this study.

In the following chapters, the case studies presented will be analyzed from the point of view of the theoretical models and principles of diachronic change outlined in this chapter. Certainly, the study of such changes is only beginning, and I will attempt in all cases to point out the features of prosodic systems which do not yet fit easily into such a model, or which appear to be unmotivated. Yet, as we will see, there is a remarkable overlap between extremely divergent languages and prosodic types concerning the types of change which they have undergone. These common patterns of change have been at the root of the formulation of the ideas discussed here, and they can often be described in surprisingly straightforward ways by making use of metrical and autosegmental terminology.

In order to set the stage for a wide-ranging comparison of prosodic systems, it will be most helpful to begin with a well-documented and diverse set of languages. We will therefore turn our attention first to Latin and its sister

languages within the Italic subfamily of Indo-European, which demonstrate many of the principles both of prosodic organization and prosodic change outlined here. At the same time, it will be of value to briefly discuss some of the accentual systems found in other older IE languages for the purposes of comparison, and to place the rules suggested for Italic within a general IE context.

Chapter 3: Italic Prosodic History

In this and the following chapters, we turn to the heart of our discussion: the application of the ideas on prosodic change discussed in Chapter Two to selected data from a number of prosodically interesting languages. This part of the study has three main goals. First, as an attempt to account for cases of prosodic change, it will serve as a test of the adequateness and usefulness of the current theoretical model. Second, it will allow us to examine the accuracy of the general principles outlined in the previous chapter. Finally, if successful, it will give us a formal framework for describing the evolution of accentual systems in general.

The first case study deals with the languages which make up the Italic branch of the Indo-European family¹. Two major sub-groups are found within Italic: Latin-Faliscan and Oscan-Umbrian, the latter also including a number of minor dialects such as Paelignian, Volscian, and Marrucinian (von Planta (1892); Beeler (1966)). The inclusion of Venetic within the Italic group is problematic, and I will not deal with it here (Beeler (1949)).

The quantity and quality of the extant data for the various Italic languages varies greatly. From the wealth of

¹ There remains some dispute over the exact make-up of the Italic subgroup, and even over its existence as a unified family (see, e.g. the alternatives suggested by Devoto (1951)). I assume here the divisions accepted by the majority of scholars in the field.

Latin inscriptions and texts, we descend sharply to the extremely limited corpus of Oscan inscriptions and the almost singular attestation of Umbrian on the Inguvine Tables (Buck (1928), Vetter (1953) and Pocetti (1979) give most of the non-Latin Italic inscriptions; Poultney (1959) is the best presentation of the Inguvine Tables). All other dialects survive only in isolated, often extremely short inscriptions and fragments. In no case other than Latin do we have direct testimony concerning the rules of accentuation, though theories have been presented based on syncope and other observable features; these will be discussed in detail below.

Faliscan appears to have been quite close to Latin in most respects of its phonology and morphology, though there are a number of striking differences (e.g., Faliscan genitive singulars in -osio next to Latin -f², Fal. ves = Lat. vos, etc. (Giacomelli (1963))). It is clear that, through contact and domination by Latin speakers, Faliscan lost many of its unique features. The information about accent and syncope in Faliscan is very sparse, and can be included in the general discussion of those features in Latin.

Oscan and Umbrian, on the other hand, both show major phonological differences from Latin. The most important of

² The use of an -osio genitive in the text of the Lapis Satricanus (Stibbe 1979), if the language there is in fact a dialect of early Latin, would indicate that this represents less of a difference than it would at first appear.

these for our current study is the greater degree of syncope of short vowels in open syllables found in these languages in comparison to Latin. It also appears that the process of vowel merger, generally termed "vowel weakening", found in Latin, did not appear in either Oscan or Umbrian. The syncope of those languages would have eliminated many of the subjects for such a rule in any case, but vowel weakening is not found even in closed syllables or in diphthongs, where syncope would not apply.

To the extent that we can tell, the smaller dialects of this subgroup appear to have had a process of syncope similar to that found in Oscan and Umbrian (von Planta 1892). Since the accentual system of these languages cannot at present be determined, and no metrical texts are extant, this syncope provides our best source of information on the prosodic systems of these languages and will be examined in some detail.

In the three major languages within Italic (Latin, Oscan, and Umbrian), the assumedly regular process of syncope has been obscured by a large amount of analogical levelling, especially within nominal paradigms. It is also unclear if alternations such as Latin cadus/calidus or Oscan

Popidis/Popdiis³ represent dialectal differences (either geographical or social), stylistic variations, orthographic inconsistency, free variation, or, in the Oscan case, a simple spelling error.⁴

3.1 Accent and Vowel Weakening in Latin

For the purposes of the current study, three areas of Latin phonology are of most interest. First, the rules governing the historical Latin accent will be presented in a metrical framework. Second, the phonetic nature of the accent will be discussed. Finally, the process of vowel weakening, found in a broad set of environments, will be described in terms of an autosegmental theory of phonology. Syncope in Latin will be described in the next section.

On the conditions governing the historical Latin accent, little needs to be said here. All authorities, both ancient and modern, are on agreement on its description. The lexical accent in Classical Latin fell on the penult if that syllable were heavy (i.e., CVV or CVC), and on the antepenult if the penult was light (i.e., CV). The accent

³I follow here the standard orthographic conventions for citing Italic data. Citations from Latin are given in underlined type, as are Oscan and Umbrian forms originally written in the Latin alphabet. Oscan and Umbrian forms written in their native alphabet are given in boldface, and a glossed with the equivalent Latin form; the gloss is starred when the assumed morphologically parallel form is not attested within the Latin corpus, either due to an accidental gap or a systematic difference in the morphologies of the languages.

⁴Though there may be good reasons for these forms to show alternation; see section 3.2.

was only liable to shift if one or more enclitic elements (e.g. -que 'and', -ne 'not?', etc.) were added to a word. In such cases, the resulting form is treated as a single phonological word with the accent assigned by the normal rules.⁵ A few other exceptions arise from contractions and apocope, leading to final syllable accent; these present no difficulties for the overall rule (Lindsay (1894:163)).

There is neither marking nor discussion of a secondary accent in any of the Roman sources, unless we take Varro's mention of a prosodia media (Sergius IV, 529) to indicate such; but the passage seems to have more to do with intonational patterns than accentual ones⁶. It has been suggested by several scholars (Lindsay (1894:161), Kent (1932:66)) that the initial accent assumed for Proto-Italic became a fixed secondary accent in the historical period. This earlier initial accent will be considered below.

In metrical terms, the Classical Latin accent can be described through the following rules:

⁵Though there appear to be a number of cases in which the accent irregularly falls on the final syllable of the tonic word, when the standar rule would predict antepenultimate accent: Musā-que, liminā-que. Martianus Capella makes this a general rule (iii. 272) and other grammarians agree, though Allen (1970) suggests that the poetic data indicate that these words were accented normally, and that the grammarians have overgeneralized their rule.

⁶[P]rosodia media, quae inter duas quasi limes est, quod gravioris quam acutioris similior est in inferioris potius quam superioris numeram relegatur.

- a) Mark the final syllable of a word extrametrical.
- b) Build a single, left-headed, quantity-sensitive foot at the right margin of the word.⁷

Examples (parentheses show extrametricality):

1	(*)	(*)	(* .)	(* .)	(* .)
0	* *	* *	* *	* *	* *
	serva(re)	conser(vat)	mone(o)	patri(a)	volu(cris)

Notice that the weight of the final syllable is never relevant due to its extrametrical status, and that the syllabification of /cr/ as the onset of the final syllable allows the second syllable of volucris to count as light.

A more complex question, and one that has exercised scholars for well over a century, is that of the phonetic nature of the Classical Latin accent. It is clear that many Roman grammarians considered the accent of their own language to have been one based primarily on pitch rather than stress, and this description has been accepted by a variety of scholars in different periods (Vendryes (1902), Pulgram (1975), though only for some social classes, and Devoto (1977), etc.).

The majority of researchers, however, have argued that such description is simply an aping of the Greek tradition, from which Latin grammatical terminology is drawn (e.g. Stutevant (1940), Allen (1970); Kent (1932) suggests, and Buck (1933) appears to agree, that the Latin of the aristocracy actually acquired pitch accent from the teaching

⁷Many theoreticians would build iterating feet, build a right-headed word foot, and then use tier conflation to eliminate all but the rightmost accent.

of Greek tutors). In this regard, the reference in some grammarians to a circumflex accent is taken to show how slavishly the Romans followed the Greek model, since there is no independent evidence for an acute/circumflex distinction in historical Latin. The question of pitch vs. stress deserves a more detailed discussion before we move on.

3.1.1 The Nature of Classical Latin Accent

The major arguments for assuming stress accent in historical Latin are usually given as follows. First, it is generally accepted that prehistoric Latin (and generally Common Italic as well) had stress accent, to account for the widespread syncope found in Latin and in other Italic dialects. Thus, it would seem strange for Latin to have gone from the inherited Indo-European pitch accent to a stress accent and then back to a pitch accent. Second, the accents of the Romance languages are universally stress rather than pitch. Third, there is some evidence for syncope apparently due to the historical Latin accent rather than the prehistoric initial stress (either before or after the accent: disciplīna beside discípulus, sinístĕra > sinistra, nostrá̄tis > nostrās). Since syncope is not known to be triggered by pitch accent, as its almost total absence in Greek and Vedic would indicate, the stress nature of the Latin accent is considered proved.

Fourth, it has been argued that languages in which the placement of accent is determined by syllable weight rather than by vowel length alone generally have stress rather than

pitch accent (Allen 1970:85). Fifth, the process of imabic shortening, in which the sequence "accented light syllable + heavy syllable" became "(accented) light + light" is clearly based on a preference for patterns of syllable weight corresponding to accent placement, indicating stress rather than pitch. Finally, the desire of Latin poets to have verse ictus and lexical accent coincide in the last two feet of the hexameter line points to stress rather than pitch accent (cf. Greek hexameter, where no such pattern is observed; but see Allen (1973, 1987) on the idea of stress in Greek and the further discussion in Chapter Four).

Against these arguments, those defending the pitch accent theory turn first to the descriptions given by the Roman grammarians themselves. If taken at face value, their testimony clearly points to Latin accent having been marked primarily by distinctions in pitch. The three most important references are given here:

Varro (116-27 BC): "Ab altitudine discernit accentus, cum pars uerbi aut in graue deprimatur aut sublimatur in acutum (K. iv, 525ff)

Nigidius Figulus (1st century BC):

"Voculatio qui poterit seruari, si non sciemus in nominibus ut Valeri, ultrum interrogandi an uocandi sint? Nam interrogandi secunda syllaba superiore tono est quam prima, deinde nouissima deicitur, at in casu uocandi summo tono est prima, deinde gradatim descendunt (Noct. att. XIII, 25)⁸

⁸ But is this an accentual feature, or simply a difference in intonation between vocative and interrogative usage? The exact details are not discernable from the overall discussion.

Cicero (106-43 BC):

"[I]psa enim natura, quasi modularetur hominum orationem, in omni uerbo posuit acutam uocem, nec una plus, nec a postrema syllaba citra tertiam." (Orator XVIII, 56ff).

The language used in these passages is, of course, open to a certain degree of interpretation, but enough similar citations could be made to show that the connection made between Latin accent and musical tone is clearly established. The passage in Cicero is especially useful, since it is clear from his reference to the "three-syllable rule" that he is not merely discussing intonation, but the actual lexical accent as "acutam uocem". Vendryes (1902:26) comments appropriately:

Assurément chez Cicéron, comme chez Varron et chez Nigidius, les termes employés sont empruntés aux Grecs; c'est sans doute qu'il n'y avait aucune différence de nature entre l'accent latin et l'accent grec, lequel était musical...; concevrait-on qu'un maître de la parole aussi minutieux que Cicéron fût l'esclave des théories grecques au point d'enseigner en vue du discours public des règles en contradiction absolue avec la nature de son langage?

This would appear to be the more reasonable position compared to that of Allen, who argues that "[t]he very similarity of the Latin statements to those which apply to Greek is therefore an embarrassment rather than a support to the idea of a pitch accent in Latin." (1970:84).

As Vendryes also points out, the importation of Greek terms which do not immediately seem relevant to Latin, such as the circumflex, can itself be evidence for the reality of a pitch-based system. He shows (1902) that there were two traditions on the "Latin circumflex"; the earlier authori-

ties, including those mentioned above, and the later (second-fourth centuries AD) commentators. It is this latter group which "slavishly" follows the Greek rules of accentuation, marking such distinctions as Rôma vs. Rômae. In the earlier works, however, the circumflex is used simply to mark vowels long by nature (CVV) as opposed to those long by position (CVC), which were marked with the acute. Thus, the original usage applied the borrowed diacritic to a real distinction within the language, unlike the later artificial practice.

Besides using the testimony of the Roman grammarians, the defenders of the pitch accent theory respond to their attackers as follows. First, as we will see, the case for prehistoric initial stress in Latin is not as clear-cut as it may seem; in any case, it is entirely possible for a language's prosodic system to make use of both stress-like features and pitch accent simultaneously. Such an approach may be more productive than positing, as Kent (1932) does, the origin of the historical accent through the interchange of primary and secondary stresses before the historical period.

Second, the evidence of Romance is not conclusive, since there are a good number of cases of pitch accent developing into stress without a change in the position of the accent (Greek and Russian being only two handy examples). Third, what is striking about the historical Latin accent is not the syncope that it causes, but the

overall lack of syncope, especially when compared to the numerous prehistoric cases.

Fourth, is it not in fact the case that pitch accent languages do not make use of syllabic weight conditions; the placement of Japanese accent in some types of compounds is sensitive to syllable weight (Poser 1990:98)⁹, and, if Steriade (1988) is correct, weight was relevant in Classical Greek as well. Finally, on the issues of iambic shortening and metrics, it can be argued that such "matchings" of ictus and accent clarify the origins and nature of the Latin pitch accent. Here we must return to our discussion in Chapter Two concerning the variety of types of pitch accent. While we would not expect inherent accent to play a role in these types of segmental processes, it would be perfectly natural for metrical pitch accent to behave in ways that have been traditionally reserved for stress.

Siding with the minority (though an often distinguished one), I will attempt to bolster the case for the survival of a pitch-accent system, based to some degree on the inherited Indo-European accent, at least until the first century BC in educated, urban Latin. But I do not believe that we are

⁹The relevance of syllable weight in this case is admittedly quite indirect. In some compounds, accent falls on the second member only if it is more than two morae long. A bisyllabic form such as udon 'noodle' or ona 'woman' as second members will receive the accent because of the heavy syllable on in both cases. In general, Japanese accent is assigned morphologically rather than on phonological grounds.

faced with an "either/or" situation. I suggest that we can have our cake and eat it too, so to speak, by making use of some of the ideas presented in the previous chapter. Specifically, a case can be made for the coexistence of a stress-like but non-accentual rhythmic pattern in Italic and early Latin, originally distinct from the lexical pitch accent. It is this proeminence system, rather than the accentual system itself, that accounts for the majority of cases of syncope in Italic. Through time, the two prosodic systems interacted to a greater and greater degree, eventually leading to the loss of free accent placement, the development of the Classical Latin three-syllable rule, and the final replacement of pitch accent with stress accent. Before beginning our investigation of this issue, however, we should examine the second major area of Latin-specific prosodic evidence, vowel weakening.

3.1.2 Vowel Weakening in Latin

In certain contexts, vowels in Latin could be "weakened", a somewhat unfortunate term used to indicate a change in quality resulting in merger. Weakening could affect both short vowels and diphthongs, but not long vowels; it occurred, in different forms, in both open and closed syllables. It is generally claimed that weakening does not occur in initial syllables, but there appear to be a few examples that contradict this generalization (Brugmann (1897) gives the most forms). In any case, the most common position for weakening is the second syllable of words, with

initial weakening by far the rarest type.

The general result of vowel weakening involves both raising and, to a lesser extent, fronting of the weakened vowel. The facts of vowel weakening are summarized in the following chart (based on Kent (1932) and Radke (1981)):

original	in open syllables			in closed syllables		
	/ l /	/ r /	elsewhere	/ lC /	/ ng /	elsewhere
a	u	e	i	u	i	e
e	u	e	i ¹⁰	u	?	e
i	?	e	i	?	i	i
o	u	e	i ¹¹	u	u	u
u	?	e	i	?	u	u
ai ¹²	ī in all cases					
ei	ī in all cases					
oi	ū in all cases					
au	ū in all cases					
ou	ū in all cases					

All sort vowel appear to have weakened to [u] before /w/, but the evidence is not sufficient to state this with any certainty. Examples of original /i/ and /u/ before /l/ are difficult to establish. Notice that weakening in no case results in the actual shortening or deletion of a vowel or diphthong.

While in most cases the above chart gives the correct results for weakening, it is important to realize that we cannot view all such examples as reflecting the application of a single process or as occurring at a single stage in the history of Latin. Most importantly, the vocalic changes before /l/, /ng/ and /r/ are probably not inherently part of the weakening process, since they are commonly found in

¹⁰Short /e/ remained [e] before another vowel or after /i/.

¹¹After /i/, /o/ became [e].

¹²This is the diphthong later written /ae/.

initial position. These more general changes appear to have applied after the changes identified with weakening had already taken place. The ordering of most of the remaining changes is clear from etymological comparison and from forms in earlier Latin texts and inscriptions. These show that we can divide these vowel changes into at least two historical stages.

First, short vowels in open medial syllables merged to /e/ in most environments. while in closed syllables the result was either /e/ or /o/, maintaining the original rounding of the vowel. Then, within the historical period, there was a general raising of the resulting mid vowels to high, leaving /i/ in most open syllables and /u/ from /o/ in closed syllables. Interesting, /e/ in closed syllables did not raise to /i/. The result of weakening in diphthongs appears to have been a loss of distinctive features in the first member, leaving a long version of the second vowel as a result. The one exception is the original diphthong /oi/, which weakened to /ū/ and not /ī/.

Given this outline of the history of vowel weakening in Latin, how should we go about accounting for these facts within a more formal phonological framework? Much, I believe, can be explained if we treat /e/ as the unmarked vowel in Latin, that is, as a kind of 'default' vowel as the term is used in underspecification theory. Within an autosegmental model of phonology, it is possible to describe /e/ as the default vocalization of an empty position on the

timing tier. If this proves to be correct, we can define the first stage of vowel weakening as the deletion of certain phonological features associated with a timing position; this results in the reduction of distinctive features possible in certain positions within the word, but maintains the presence of the vowel itself. In contrast, we can view syncope as the deletion of the timing position itself, leading to a loss of all features and, in most cases, a syllabic nucleus.

Let us look at how such a model would account for the specific attested results of weakening¹³. First, the five vowels of the Latin system are assigned distinctive features:

a = [+low]
e = []
i = [+high]
o = [+round]
u = [+high, +round]

The listed features are the only ones needed to distinguish the five vowels underlyingly; all other features will be filled in through redundancy rules:

[0 low] > [- low]
[0 high] > [-high]
[0 round] > [-round]

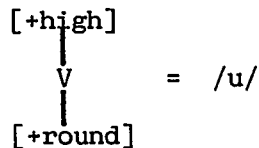
The application of these redundancy rules results in the following feature specifications for the five vowels in Latin:

¹³A more sophisticated model of these changes could be done using the formalisms of a theory of feature geometry, but for the purposes of this work, the CV-style framework is more direct and readable.

a: [-high, +low, -round]
 e: [-high, -low, -round]
 i: [+high, -low, -round]
 o: [-high, -low, +round]
 u: [+high, -low, +round]

which is sufficient to distinguish the full set of vowels.¹⁴
 The vowel /e/ is assigned no features in its underlying
 description, making it the unmarked or default vowel of the
 system.

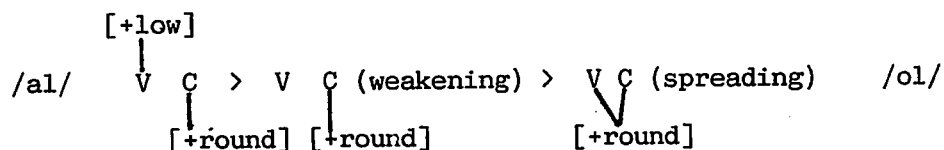
We must then determine the interdependence of the
 features, that is, which features are linked and treated as
 a unit by subsequent rules of the phonology. The rules of
 vocalic weakening, as well as the changes found before /l/
 and labial obstruents (Buck (1933:101)) motivate treating
 the height features as a linked pair, while separating the
 feature [+round]. Using a somewhat outmoded schematization
 of this distinction, I will show Height features above the
 V-slot which represents the timing position of the vowel,
 and the Round feature below it:



In open syllables, the change of all vowels to /e/ in
 the first stage of weakening corresponds to the deletion of
 all features associated with the vowel slot. The redundancy

¹⁴Recall from Chapter Two that vowel length within an
 autosegmental description is not an inherent feature of
 the vowel, but is defined as associating the feature set
 with two timing positions rather than one.

rules will then assign the feature set [-high, -low, -round] and thus produce /e/. However, before such assignment takes place, features may spread forward onto the timing position from the following segment. A velar /l/ or a labial may spread the feature [+round] onto the now featureless position, yielding /o/. As we will see, the segment /r/ appears to block the later assignment of [+high] to a preceding position, implying that it spreads the feature [-high], but this would be redundant at this stage of the process. We can describe the effect of rounding in autosegmental terms as



In the second stage of the process, vowels in positions eligible for weakening undergo raising, here understood as the addition of the feature of [+high]. The only exception is a vowel followed by /r/, where the result of weakening always appears to be /e/. This can be attributed by a spread of the feature [-high] from the sonorant at this stage of the change, parallel to the spread of [+round], above. This change yields the results found on the table above.

What remains unexplained is the motivation for the addition of the feature [+high] in the weakening environment at this stage. One possible source for this change is the phonetic shortness of high vowels when compared to other

vowels. This would be consistent with the general treatment of length under "weak" conditions, but can only be considered conjecture. Whatever the motivation for such raising, however, it is not unique to weakening itself, but is found in at least two other processes in Latin.

The first is the general raising of /o/ to /u/ in closed final syllables.¹⁵ The clarity of this process is lessened somewhat by the fact that a limited form of vowel weakening appears to occur in at least some examples in final as well as medial syllables. Short /a/ is often raised (or neutralized) to /e/, and some cases of /e/ raising to /i/ are found before /s/ and /t/. As expected, /ai/ becomes /ī/ in these cases, but /oi/ unexpectedly becomes /ī/ rather than /ū/; this demonstrates that we are not dealing with the same process as is found in medial syllables.

The second case of raising can be found in the formations made with certain roots consisting of a single vowel on the surface. If we take the verb ire 'to go' as an example, we find the following alterations in the present and perfect indicative paradigms:

Present:

e-ō	ī-mus
ī-s	ī-tis
i-t	e-unt

Perfect:

i-ī	i-imus
ī-sti	ī-stis
i-it	i-erunt

¹⁵In general, any single consonant will close a final syllable, though the special status of final /m/ and /s/ will be discussed below.

The change in this particular form involves a historical contraction of the root from *ei-, but can synchronically be understood as an alteration triggered by the presence of a following vowel in the ending. This alteration is thus parallel to the treatment of /e/ before a vowel in the weakening environment, where the assignment of [+high] in the second stage of the process is blocked if the /e/ is followed by another vowel. We can therefore see the change of /e/ to /i/ in the forms of ire as the same raising process found in weakening.¹⁶ The personal pronouns is, ea, and id display an identical pattern (starting from a root *i-).

The changes in vowel quantity seen in both paradigms of ire can be explained through two general constraints on vowel length in Latin. First, when vowels in two separate syllables are adjacent, only the second may be long. This constraint results in the shortening of the first vowel if the second is long, and the transference of length ("quantity metathesis") if the second vowel is short. Secondly, a long vowel is shortened in a closed final syllable; a final /s/, however, is not considered to close a syllable in this case.

If we assume that the root of the verb ire has two forms, one in the present paradigms and one in the remaining

¹⁶The verbal alternations are actually a broader version of the process, since they are found even with long vowels and in closed syllables, neither of which would be true in cases of weakening itself.

2nd pl. $V V - \begin{array}{c} t \\ | \\ C \\ | \\ V \\ | \\ C \end{array} > \begin{array}{c} [+high] \\ \wedge \\ V V - C V C \end{array} > \begin{array}{c} [+high] \\ \wedge \\ V V - C V C \end{array} = \text{ʔtis}$

3rd pl. $V V - \begin{array}{c} u \\ | \\ V \\ | \\ C \\ | \\ C \end{array} > V - \begin{array}{c} u \\ | \\ V \\ | \\ C \\ | \\ C \end{array} > V - \begin{array}{c} u \\ | \\ V \\ | \\ C \\ | \\ C \end{array} = \text{eunt}$

The perfect paradigm shows the same patterns of shortening, but does not show any alternations involving height. Since we suggested that the perfect root already was associated with the feature [+high], it would then be possible to say that such changes as seen in the present paradigm only occur when the no height features are preassociated with the vowels.

Thus, the details of this paradigm show that what we have been calling the second stage of the weakening process is actually a considerably more general process of raising involving empty vowel slots in a number of situations. We can therefore identify weakening itself simply with the first stage of the process, i.e., the loss of height distinctions.

In closed syllables²⁰, we find an important difference

¹⁹The presence of three contiguous V-slots would normally lead to quantity metathesis in this situation, but a long vowel is not allowed in a closed final syllable. The result is to shorten the first vowel without lengthening the second.

²⁰I present these rules as differing based on the openness of the syllable, while many authors distinguish weakening "before a single consonant" and "before two or more consonants". These approaches differ when the issue of syllabification of consonant clusters arises. Thus, the /i/ in Radke's example sinister (1981:23) is "before two consonants", but probably stands in an open syllable.

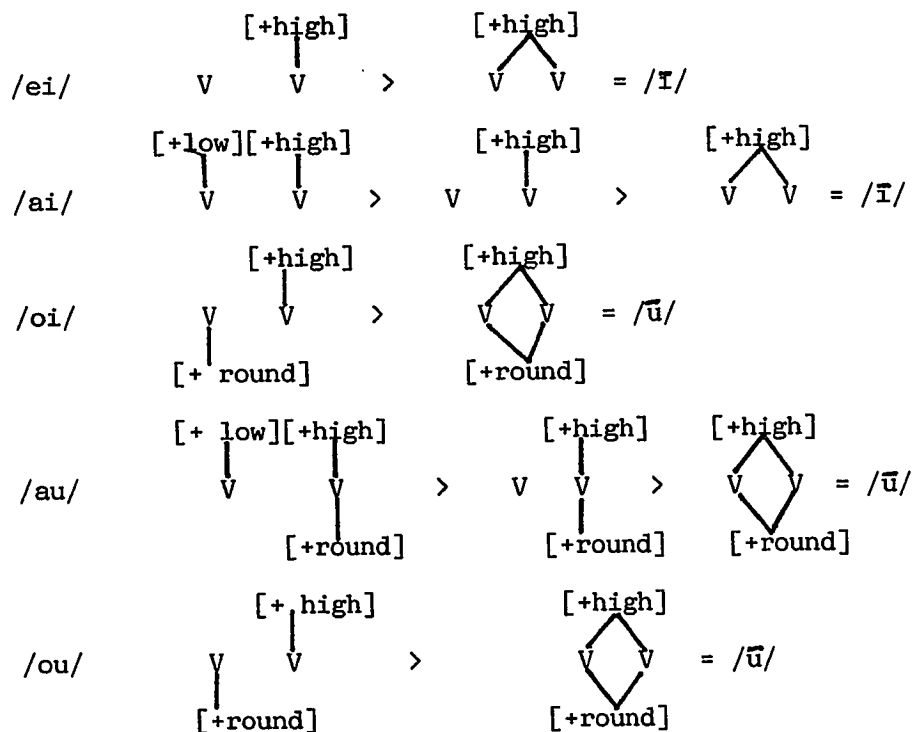
in the operation of vowel weakening. While the normal distinctions of height appear to be at least partially neutralized, the original value of the feature [\pm round] is generally maintained. Thus, /o/ and /u/ appear to have been neutralized to /o/ in the first stage of the change, while all other vowels became /e/. The rounding effect of /l/ continue when it forms the coda of a closed syllable, with the vowel becoming /u/ in all cases. The sequence /ng/ also raises vowels to /i/ or /u/ depending on their original roundness.

The remaining results if weakening are somewhat problematic. The same general raising process found in open syllables appears to apply here, except to /a/ and /e/, which merge as /e/ rather than /i/. Under the model presented here, it would be necessary to assign the feature [-high] in these cases to prevent their raising, much as /r/ does in the open syllable cases. Yet there is no explanation for the raising of /o/ to /u/ in this case, and any solution to distinguish the conditions blocking the regular raising rule appears ad hoc.

Instead, I believe that we must treat the results found under lists of "vowel weakening" examples in closed syllables as the results of several separate processes. Instead of assuming a general deletion of features, it would appear that the only feature actually affected by weakening in closed syllables was [+ low]; its deletion merged /a/ with /e/. All other segments remained without change,

except for the raising of /o/ to /u/. This change occurs in a number of environments in Latin, and does not necessarily represent the process of vowel weakening at all. Thus, if stage one of weakening in these cases involved simply the loss of [+low], and stage two (raising) did not apply at all, we would have an adequate first approximation of the facts.

The changes found in diphthongs are consistent with the model already proposed for the short vowels. Two significant facts are immediately seen concerning the diphthongs: no shortening occurs, since the result is always a long monophthong; and it is the first of the two vowels that loses features. As with closed syllables, the only feature lost is [+ low]. The results can be described as:



Within this model, there is no difference in the processes needed for short vowels in closed syllables and those need for diphthongs. The most interesting effect of weakening in the latter is the increase in the spread of features between adjacent elements. Notice that, in many cases, non-weakened diphthongs do not share features even when such spread would normally be allowed, as in the spread of [+ round] from the first to the second vowel of /oi/. Weakening can therefore be seen as a loss of restriction on such spread of features, leading to a neutralization of the original diphthongs with the long high vowels. In no case is the weakened vowel shortened, except with regard to possible phonetic differences in vowel length.

The weakening of diphthongs can be found in initial syllables, but only under very specific conditions. If the vowel of the second syllable was lost through syncope, and this results in the first syllable containing the sequence /ou/ or /eu/, these new diphthongs often "weaken" to /u/ (cited in Radke (1981:33ff):

- *bouibus > būbus (Plautus, Truc. 646)
- *breuima > brūma (Terrence, Phormio 709)
- iouestod (CIL I:2:1) > iūsto
- *ouipilio > ūpilio (Vergil, Eclogue 10, 19)

Of course, this process need not be identified with weakening, and might rather be seen as a direct reaction to the syncope itself. It should be noted, however, that such examples are most often dismissed as not representing weakening simply because they occur in the initial syllable; they are ruled out a priori under the standard definition of

weakening, though there is no formal difference in the results.

To summarize our formulation of vowel weakening as a prosodic process in Latin, we should make three observations. First, there was no need for any type of metrical formulation of the rules for syncope, simply because there are no set rules governing exactly where it occurs. If we wish to exclude the initial syllable, we may, but this may argue simply for a kind of analogy to the treatment of the initial syllable in the metrically based rules of syncope in Latin and Oscan-Umbrian. Second, many of the changes which have been identified with a single process of "weakening" are actually broader rules which appear in a wide variety of positions and under various conditions within Latin itself. Third, while it is clear that both vowel weakening and syncope were operating contemporaneously for some time during the early history of Latin (Radke 1981:33), the relative lateness of weakening in comparison to many of the shared Italic processes which we will examine in later sections limits the value of weakening in revealing the facts of the older prosodic system. In order to get a more exact picture of prehistoric prosody of Italic, we will need to take a look at features shared by Latin with its related

languages.²¹

3.2 Prehistoric Italic Prosody

Our information on the prosodic features of Common Italic comes from three main sources:

- a) accentual and segmental processes in archaic Latin;
- b) syncope in Latin;
- c) syncope in Oscan, Umbrian, and the minor dialects.

Of the accentual systems in Italic outside of Latin itself, we have no direct evidence.

Category (a) is unfortunately severely limited. We can see some evidence for an older accentual pattern in the earliest Roman authors, especially Plautus, where quadrisyllables with the first three syllables light appear to have had initial accent: fácílius, séquimíni, cécídéro, múliĕrem. This is generally assumed to be a survival of the general initial accent posited for all words in Prehistoric Latin. The metrical patterns found in the early dramatists give some information on the treatment of syllabification,

²¹Brugmann (1897:230) gives three examples of forms in Oscan and Umbrian which appear to have undergone vocalic changes similar to weakening in Latin:

Oscan praefucus 'prefectus', cf. facus
Umbrian prehubia 'praehibeat', cf. praehabia
Prestote, Prestate '*Praestitae'

The /u/ found in the first two examples can be explained by the adjacent labial segments, but the presence of /o/ rather than /i/ in the third case cannot be accounted for under the Latin rules. These examples are not sufficient to posit a shared rule of weakening, and Brugmann himself states, "Die Absorption (Synkope und Samprasasarana) haben bereits in uritalischer Zeit begonnen, während Vocalschwachung... einzeldialektische Vorgänge war." (p. 214)

but none on accent itself. Even the evidence on syllable weight must be understood in the light of the Greek influence on Roman literature.

It is often claimed that the Saturnian meter, which clearly stands as the oldest Roman verse pattern, is at least partially based on accentual factors (see, e.g. Leo (1905), Radke (1981)). If this could be clearly established, the Saturnian would provide invaluable indication of accent placement in early literary Latin. Unfortunately, Cole (1969) is convincing in his argument that there is no persuasive reason for assuming that the dominant organizational principle of this poetry was anything but a straight syllable count and a relatively flexible set of syllable weight requirements. If accent was taken into account at all, it appears to have been only as a stylistic feature parallel to alliteration, and thus the verse provides no clear support for any particular theory of early Latin accent.²²

Turning to category (b), the syncope facts preserved in Latin present much more direct evidence for the prehistoric

²²Cole also makes an interesting connection between his analysis of the Saturnian line and older Irish meters (see Watkins (1963) for background), which parallel each other in often striking ways. In the Irish verses, stress is not a basic organizing principle of the line, though there is an established accentual pattern in the final three syllables as a sort of coda. This regularity, which resembles the weight-based codas in a number of other Indo-European poetic traditions, might indicate that a similar pattern could have existed in the Saturnian as well, but the data does not seem to be sufficient to judge on this point.

system. It is clear that vowels could undergo two distinct types of change in Latin, weakening and syncope, as opposed to the broader syncope rule shared by Oscan and Umbrian. Both of these Latin processes have generally been attributed to the effects of the original initial stress accent, but, as we have seen, it is difficult to make such a claim stick for weakening. For syncope, however, it is clear that the initial syllable is immune; this is in fact the primary evidence put forward to argue for initial stress in Latin. Let us examine this process more completely at this point.

3.2.1 Syncope in Latin

The actual process of syncope can be viewed within an autosegmental framework as deleting, not the features associated with a timing position ("vowel slot"), but the position itself. In Latin, syncope applies only to short vowels in non-initial syllables. While no set of rules can completely account for all the cases of syncope (due to analogical levelling), it is possible to give a general outline of the conditions most favorable to syncope. A number of authors have proposed essentially identical statements; the rules here are from Kent (1932):

1. In open medial syllables, a short vowel was lost unless the third syllable was final and contained a short vowel:

Ex: *deksīteros > dexter²³
 *repepuli > reppuli
 *primōcaps > princeps
 *praidīko > praeco
 *juvėnios > jūnior, cf. juvenis
 *āridōs > ārdor, cf. āridus < *aridōs²⁴

2. In closed medial syllables, a short vowel was lost after /u/:

Ex: *nouėndinom > nundinum or nondinum
 *auizdyo > audio

3. If the second syllable was long (heavy?) and kept its vowel, a short vowel in an open third syllable of a word of four or more syllables was lost:

Ex: *sinistėri, *magistėri > sinistri, magistri

4. Syncope took place after iambic shortening in the classical period, as a result of the (historical) Latin accent:

Ex: calėfācere > calėfācere > calfācere

5. In final syllables, an absolutely final /e/, /o/, or /i/ was often lost before words beginning with a consonant; these losses seem to have been of different dates:

Ex: *totī > tot
 *autī > aut (cf. Umbrian ote, Oscan auti and aut)
dicē along with dic
 *animalī > animal

(This rule is blocked if the loss of the final vowel would obscure grammatical forms: agitē, agerē, fortē, marē, etc.)

6. In final syllables, /i/ was often lost by syncope before /s/, but not in pyrrhic disyllables, and /o/ was lost before /s/ in some words, though this was probably not a pure Latin phenomenon, but of dialectal origin:

²³The loss of /o/ in the final syllable here falls under rule six.

²⁴Kent (1932:122) attributes this difference to analogy which "has leveled the syncopated forms to the unsyncopated" to avoid the paradigm āridus ārdī ārdō āridum. We shall see, however, that this form can be taken as the normal result of the rules of syncope suggested later.

Ex: *keleris̄ > celer
 *m̄rtis̄ > mors (so urbs, arx, etc.)
im-potis̄ > impōs (cf. pōtis̄, a pyrrhic disyllable)
cujātis̄ with dialectal cujās

One further detail of syncope needs to be mentioned. If the syncopated vowel was preceded by a sonorant, the sonorant could vocalize, so that the total number of syllables was not decreased (the process of samprasarana). Within Latin, we have examples of this occurring with /y w n r l/:

Ex: *medyo- in Mediterraneus
 *kom-kwatio > concutio (cf. quatio)
 *signolom > sigillum (<*signlom with -nl->-ll)
 *akris > acer
 *faklitats > facultas (l > ul in syllable final position)

However, this process is considerably broader than other cases of syncope. In many cases, such samprasarana occurs even when the syncopated vowel stands in a closed syllable, in which syncope without samprasarana is never seen.

As mentioned, this observed pattern of syncope (along with alliteration in Italic verse and some rhythmic features in Latin set phrases) are taken as evidence for initial stress accent. This explanation, however, is not entirely satisfactory. While an initial accent accounts well for the absence of syncope in initial syllables and the common syncope of second syllables, it is not as useful in explaining syncope later in a word. It is common to read of weakening and syncope occurring in unaccented syllables, with these being defined as "all syllables after the first". Yet, while such a pattern is common in pitch accent systems,

it would be more unusual in a stress languages, as Latin would have to be to make the theory work. Rarer still would be a single accent, regardless of position, that could cause syncope throughout the rest of the word.²⁵ Syncope is, by and large, the result of an adjacent prominent syllable (often stressed, but not always so).

We must also wonder about the condition on medial syncope (by far the most common type) included in Kent's Rule 1, namely, that syncope does not occur in words of the form CVCVCV(C)#. If the trigger for syncope is simply the initial accent, it seems strange that it should be blocked by the vowel length of the third syllable. It cannot be argued for Latin, as Benediktsson (1960) has for Oscan and Umbrian, that such medial syncope had been blocked by an earlier final-syllable syncope, since it clearly has not taken place in the Latin examples: see aridus and juvenis above, as well as such forms as calidus surviving next to the unexpected caldus.²⁶

Also, we must consider the history of words such as

²⁵There are examples of systems with only one major stress accent per word that show extensive vowel reduction throughout the rest of the word; such is the case in Russian. Syncope, however, seems to be sensitive to smaller distinctions in levels of stress, and so usually occurs only adjacent to the motivating accent, or in an alternating pattern consistent with a metrical grid.

²⁶Or is it unexpected? While this condition does explain many forms, it also has a good number of exceptions: viridis < viridis (Plautus, Men, 828), or valde < valide (Plautus, Pseud. 145, 364). As I will suggest, these forms are more complicated than Kent's rule suggests.

officina, from an earlier *opi-fac-in-a. Here we have syncope in the second syllable and vowel weakening in the third. If both processes were triggered by an initial accent, as is generally argued, we should expect either that the second syllable would be affected earlier, or that both processes would be simultaneous. In fact, however, it is the third-syllable weakening which occurred first, as shown by the form opificina in Plautus (Mil. 3,3,7)²⁷. Why should the later syllable be affected first?

Of course, given what has been said earlier concerning vowel weakening, it would be possible to diassociate weakening from the idea of an initial accent. The syncope of the second syllable would then be expected, and weakening would be based on more general principles, as discussed above. In this, however, part of the justification of initial accent has disappeared. But to do otherwise is to run into a difficult contradiction on ordering the processes.

It seems, then, that we need to make a more careful analysis of the conditions governing syncope itself in order to show the different bases of these two processes. I would suggest that syncope can be taken as evidence for the metrical structure of Early Latin (and, in a slightly different form, Common Italic), understood as a model of the

²⁷Assuming a derivation from *opifecina does not change the argument.

prominence peaks and troughs of the speech rhythm. While it is not possible to give a more specific description of the surface realizations of the prominence assigned by such a reconstructed system, it does seem that the result must have been similar in some ways to phonetic stress. Yet this is stress, not as an accentual feature, but as a secondary or backgrounded system within Latin prosody.

The facts of Latin syncope can be summarized by assuming a metrical grid built in accordance with the following parameters:

- a) Level 0 markings are on syllables;
- b) Build a single binary left-headed foot on level 1 at the left margin of the word;
- c) Assign all heavy syllables (i.e. branching rimes) a level 1 asterisk;
- d) Build binary, left-headed, quantity-sensitive feet from right to left;
- e) Syncope: short vowels in open syllables in weak metrical positions are eligible for syncope.

By convention, if a foot is built over two light syllables the head (i.e., the leftmost syllable in this system) will receive an asterisk on level 1. Notice that, unlike a typical stress-grid, there is no need within this system to build hierarchical structures above the foot level.

The metrical prominence of the initial syllable would fall out of this analysis without the necessity of building a left-margin foot in step (b), as was the result of a similar rule in the Passamaquoddy example in Chapter Two; here, however, the presence of a full foot is needed to predict certain prominence clashes indicated by the evidence

of words falling under Kent's Rule 1. It should be pointed out that, while a number of other Indo-European languages also show signs of having a single left-margin metrical foot (see Vedic and some Slavic in the next chapter, and Old Irish in Chapter Six), this initial foot in Latin appears to have been an innovation rather than a retention, since it is unnecessary to assume such a structure for the (presumably older) syncope rule of Oscan and Umbrian.

The building of a single foot at what would otherwise be considered the end of the metrical structure is not in fact an unusual situation, and a number of examples of such systems exist. Apparently, a metrical prominence at one margin of a word has been generalized in these cases. Specifically, a marginal syllable which, because of the nature of the metrical structure rules, always receives metrical prominence is re-analyzed as the head of a fixed foot. The remainder of the phonological word is still assigned prominences by the original, iterating foot-construction rule.

Applying the set of parameters to some examples of Latin, we find structures such as:

level 1	(* .)(* .)	(* .)(*)(*)	(* .)(*)(*)
level 0	* * * *	* * * *	* * * *
	dek si te ros	re pe pu lī	quin que de cem
level 1	(* .)(*)	(*) (* .)	(* ? .)(*)
level 0	* * *	* * *	* * * *
	per re go	dam nā tus	si ni ste rē
level 1	(* .)(*)	(* ? .)	
level 0	* * *	* * *	
	ā ri dōs	ā ri dōs	

In the examples above, a number of forms require comment. In dexiteros, the rules of metrical structure allow the construction of two metrical feet; the form thus undergoes syncope twice, resulting in dexter (with final /rs/ > /r/ by regular rule). In repepulī, the final long vowel prevents binary foot construction over the ultima, and (in these cases), the already existing initial foot blocks construction of anything but a degenerate foot over the penult. The final syllable of quinquedecem (later quinquedecim) may or may not count as closed, for final /m/ was often murmured and uncounted when determining weight in metrical texts. Thus, we could recast this form with two binary feet and the same result.

Perrego is syncopated to pergo as expected. The form damnās for damnātus is found rarely, and is somewhat unusual. While the syncope of /i/ in final syllables before /s/ is quite common (e.g. the rules under Kent's Rule four, above, or hospes from *hostipotis and double syncope), the deletion of /u/ (or, earlier, /o/) in this position is extremely uncommon. In sinisterē, the syncope of the third rather than the second syllable is accounted for by Kent by having the second syllable long, assumedly by position since the vowel itself was never long in this form. But it would be quite unexpected for an /s/ here to make positional even if it did not syllabify as the onset of the following syllable, short vowel + /s/ even in medial position would not have been counted as heavy for the purposes of poetry.

The grid solution also would apparently make the wrong prediction, since the initial foot should force the construction of a degenerate foot over the penult. While there is no satisfactory answer for this form, it is insightful to compare it to the next two examples, āridōs and āridōs.

These forms illustrate an important feature of the Latin syncope which does not appear in the parallel Oscan and Umbrian rules. While āridōs undergoes syncope as predicted, āridōs is something of a problem. Here the middle syllable could be seen as belonging to either the initial or the final foot of the word (much as the position of the second syllable in sinisterē is ambiguous). Unlike the example of repepulī, where the initial foot was clearly dominant (perhaps due to the morphological treatment of words with prefixes), in cases such as āridūs, cālidūs, solidūs, and avidūs, the two possible interpretations appear to have been in competition. We find both syncopated and unsyncopated forms for all of these examples, often being distributed between different social dialects.²⁸ Cases such as sinīstērē, where the medial foot appears to have completely won out over the initial foot, may represent very ancient examples of syncope, since this would be the expected result in the Oscan and Umbrian rule.

²⁸Augustus is reported to have stated that Julius Caesar said calidum instead of caldum "non quia id non sit latinum, sed quia sit otiosum." (Not because it wouldn't be Latin, but because it would be common.)

The rules of vowel weakening obviously are not conditioned by a similar metrical grid. Their application is much broader than that of syncope, an indication in itself that we are dealing with a later process in Latin, not directly related to the inherited prominence system. The general immunity of the first syllable to vowel weakening is perhaps best seen as a kind of "phonological analogy" to the lack of syncope in this position, rather than a reaction to the older metrical pattern itself. This helps to explain the absence of vowel weakening in Oscan and Umbrian in such examples as Oscan Maraiieis, Pumpaiians next to Latin Mareius, Pompeianus with /ai/ > /ei/.

3.2.2 Syncope in Oscan and Umbrian

If we now turn to the other major languages of the Italic family, we find a remarkable similarity between the formulation of the above syncope rule of Latin and the underlying metrical structure suggested by the Oscan-Umbrian syncope rule.

Like the Latin rule, syncope in Oscan-Umbrian does not appear to ever occur in initial syllables²⁹, and is restricted to short vowels in open syllables. Unlike Latin,

²⁹Though von Planta (1892:213) finds cases of apparent syncope in this position in Paelignian, a smaller dialect of the Oscan-Umbrian group: Ptruna, pperici (cf. Latin peperci), and in Praenestine: Dcmius and conia < ciconia. The possibility of spelling errors or abbreviation playing a role in the examples cannot be overlooked, and there are simply too few examples to make any general statement about them.

syncope of vowels in absolute final position is rare in Oscan-Umbrian, though syncope in final syllables before /s/ and, in cases involving samprasarana, /m/, is fairly common.

Examples of syncope in Oscan and Umbrian:

Umbrian fratreks < *fratrikos Oscan: opsannam < *opesannam

Ereclum < *aizekelom meddix < *medodiks

ostensendi < *opestendesenter luwkis < *luwkyos³⁰

The best description of syncope in this branch of Italic is Benediktsson (1960), who surveyed all of the forms available at that time. He posited two separate rules to account for the changes found in these languages. First, syncope occurred in final syllables, which he attributed to the generally weak pronunciation of final elements. Then, an unrelated rule of medial syncope applied, caused by the strong expiratory stress of the initial syllables of words in Common Italic. He summarizes this second rule as follows:

In medial syllables any short vowel was syncopated, beginning with the second syllable of the word, provided that the syllable was open on the vowel was followed by s + consonant, and provided further, that the vowel was not immediately followed by another vowel.

Benediktsson's condition concerning /s/ + consonant clusters can be set aside, as such clusters (at least in the available examples) would apparently always syllabify as

³⁰The exact etymologies of many Oscan and Umbrian forms are a matter of debate; I have tried to follow Benediktsson (1960) unless there seemed to be clear reason to accept another explanation.

the onset of the following syllable.

While this rule accounts for a good portion of the cases of syncope in Oscan and Umbrian, it raises a number of questions. First, must final and medial syncope be treated as totally unrelated processes? Benediktsson does so for two main reasons. Final syncope appears to occur in heavy (or, at least, closed) syllables before final /s/ and /m/, the latter only when the short vowel is preceded by /y/.³¹ Medial syncope, on the other hand, only occurs in open syllables. Benediktsson's second motivation is his argument that the initial stress which causes medial syncope could not account for final syncope; he was thus required to posit different origins for the two rules.

In response to these arguments, it should first be noted that the special phonological status of final /m/ and /s/ in Latin can be taken as evidence for their inability to completely close a syllable. It is precisely these two consonants which are regularly elided in Latin verse, indicating a weak pronunciation. Furthermore, since short /i/ in Latin was eligible for syncope in final syllables before /s/, we have another parallel between the two processes. It should not surprise us, then, that final syncope occurs in just these cases. The distinction in weight conditions between the two rules is more apparent

³¹Benediktsson does not limit syncope in final syllables after /y/ to just cases with final /m/ (1960:229), but all of the good examples in fact end in /m/.

than real.

Benediktsson's second second argument stands only as long as an initial stress is required to motivate medial syncope. As was shown in Latin, however, it is more reasonable to see both syncope and prominence as arising from the same underlying metrical structure. The "fixed initial stress" in Latin is not in itself a motivation for the segmental processes, but rather developed out of the same prominence relationships that dictate syncope. If this is correct, then the second obstacle to uniting the two rules also falls.

If we then look at the cases of syncope in Oscan and Umbrian with an eye towards writing a unified syncope rule, it quickly becomes apparent that we are dealing with a pattern almost identical to that of Latin. Again, we can see syncope as an iterative process working from right to left across the word. Though syncope itself is more thorough-going in Oscan and Umbrian than in Latin, it is narrower in application than Latin vowel weakening.

A more important structural difference between the two rules can be shown by the treatment of words of the shape CVCVCVs# . As we have seen, Latin appears to follow one of two patterns in such cases. Either medial syncope occurs normally, implying the metrical pattern

$$\begin{array}{c} (* \quad .) (*) \\ * \quad * \quad * \\ CV \quad CV \quad Vs \end{array}$$

or the final foot takes precedence, as in

(*)(* .)
 * * *
 CV CV CVs

In examples with this pattern, we should expect final syncope because of a short vowel in a metrically weak position. However, in Latin this occurs with any regularity only when the vowel involved is /i/; with other vowels it is the exception (damnas in the discussion above, and anceps from ancipes, but many more forms without the deletion of the vowel of the final syllable).

Oscan and Umbrian, on the other hand, rarely show medial syncope in these forms. Instead, the conditions for final syncope are broader, as the examples given above illustrate. In fact, to account for medial syncope, Benediktsson needs to add the condition that the final syllable be long, since otherwise final syncope would be likely to occur first. In such cases, the resulting consonant cluster at the end of the new final syllable would block further deletion.

These examples, in combination with the lack of forms parallel to Latin reppulī from *repēpulī, argue that there is in fact considerably less reason for positing a fixed initial foot in these languages. In fact, if the derivation of Oscan Nuvellum from *Nowenolom is correct, with syncope as predicted by the metrical pattern

(*)(* .)(*)
 * * * *
 No we no lom

(i.e., syncope gives *Nowenlom, then /nl/ > /ll/ by the

Oscan equivalent of the Latin rule seen earlier; the other changes are simply Oscan spelling conventions), it would appear that we do not want to posit any pre-existing foot on the left margin. If such a foot were present, we would expect this form to give *Nunolom, with second rather than third syllable syncope.

We can therefore argue that the metrical structure found in Oscan and Umbrian is simpler than that found in Latin, since it makes use of a single iterative rule of foot construction and does not require special treatment of initial syllables. We can see the Latin syncope rule as a natural outgrowth of the Oscan-Umbrian pattern, following the principles for prosodic change given in Chapter Two. Since the initial syllable will always be strong under the Oscan-Umbrian rules, it is quite natural for this strength to be formalized as a fixed metrical feature, that is, a pre-assigned foot on the left margin of the word. Notice, however, that this is not the foot structure which underlies the later Latin accent; rather, I would argue, the historical penultimate accent is a result of the loss of iteration of the general foot-construction rule. See the last section of this chapter for further discussion.

If we take the examples given above and build metrical structure based on the proposed rules of Latin minus the initial foot, the results are as follows:

level 1 (*) (* .) (*)(* .)(*) (* .) (* .)(*) (*)
 level 0 *
 = fra tri kos ai ze ke lom o pe sten de sen ter
 = fratreks = Ereclum = ostensendi³²

level 1 (* .)(*) (*) (* .)(*) (* .)
 level 0 *
 = o pe san nam me do diks luw kyos
 = opsannam = meddiks = luwkis

The application of the general rules derives the proper patterns of syncope in these cases. It also gives the proper results in cases where Benediktsson's rules have difficulty, as in the forms Nuvellum, mentioned earlier, and Ereclum, above (where Benediktsson would predict *aizekelom > *Erclom (?)) In addition to the form ostensendi given here, there are a number of examples which appear to have multiple applications of syncope, all where the metrical model would predict:

level 1 (* .)(*) (* .) (* .)(*) (* .)
 level 0 *
 = Osc. fruge tatyones nou du pen di yos
 = Osc. fruktatiuf (ns > f) = Um. nurpener (d > r/ V__ V)

The one set of examples given by Benediktsson which would cause major difficulties for the proposed metrical model are those illustrating his syncope Rule Two: "In quadrisyllabic forms with short vowel in the two medial syllables, both the vowel of the second syllable and that of the third syllable were syncopated, if the syllable in question was open. If both vowels were syncopated, the

³²I am not giving all of the details on Umbrian phonotactics, but the results in this case (i.e. the loss of /p/ and /d/ after syncope) are normal; see Poultney (1959) for an excellent overview of Umbrian phonology.

syncope in the second syllable preceded the syncope in the third." Such a pattern, with syncope in adjacent syllables, should be impossible under the proposed metrical rules. In fact, however, the evidence for such a pattern is not as strong as it might first appear to be.

Benediktsson gives seventeen examples with apparent adjacent medial syncope. Of these, four are compatible with the metrical model, since they do not appear to show adjacent syncope at all (the form ostensendi, above; Oscan Anagtiai, probably for Anagetiai < *an-agetya; Umbrian ooserclom < *awiserklom, and Umbrian tribricu < *tripedikyo). Four more involve the suffix -ter/-tr (Oscan alttru < *alit(e)ro-; Oscan mi(n)streis < *minust(e)reis; and the forms destro < *deksitero- and hontro- < *xomitero-, which are found in both Oscan and Umbrian). If these forms originally contained the full grade of the suffix, then we would have to posit adjacent syncope. But the full form -ter actually appears nowhere in Oscan and Umbrian, creating the possibility that the lack of the vowel in the suffix in these forms is due to a levelling of the older ablaut pattern in favor of zero grade, rather than syncope.

In the remaining ten forms, the etymology is so doubtful as to make their usefulness in resolving the issue

minimal.³³ The Umbrian stru(h)cla- (the /h/ marks vowel length), for example, is taken by Benediktsson to be from *struwekela- with double syncope. However, since Latin shows the alternation strui-/struk- in the root (struo, stuere, struxi, structum), there is no reason not to take the Umbrian form from *struk-kela with a single application of syncope and /h/ representing the compensatory lengthening of the vowel before /-kk-/ > /-k-/. Similar difficulties are met with by the remaining forms as well.

Since the two models, Benediktsson's rules and the metrical grid, appear to be roughly equal in explanatory power, it would appear that the ability to treat syncope as through a single underlying model rather than with two disjoint rules would make it the preferred solution. This is not to argue that syncope must then be assumed to be a single, unified historical process. Like vowel weakening in Latin, it may have applied at several stages of Italic history. The insight of the metrical approach is rather the discovery that there is no reason to assume that different rules were needed at different times; the same process seems to account for all cases of syncope in Oscan and Umbrian,

³³The Umbrian form sumtu from an assumed *supemetod or *subemetod cannot be dealt with directly by the proposed metrical model, and remains an apparent counterexample. It is possible that the double syncope here is based on the presence of the prefix, so that *emetod > *emtu, sub + emtu > sumtu, but this is speculation. Some degree of support for this idea comes from the treatment of bisyllabic prefixes in Italic, which show regular loss of their second vowel (apo- in Latin abdico and Oscan aflukad or amphi- in Latin am-puto and Oscan amvianud).

regardless of position in the word.³⁴

We can thus develop a formal parallelism between syncope in Latin and the broader pattern found in Oscan and Umbrian. Both the differences in the treatment of final syllables and the question of the initial foot, while often leading to considerable deviation in the treatment of otherwise identical forms, are relatively minor features in what are clearly two closely related prosodic systems.

3.3 Metrical structure in the History of Italic

Taken all together then, the testimony of early Latin and the syncope of Oscan and Umbrian point to a fairly consistent pattern of strong and weak syllables, common to the Italic family. It needs to be emphasized that such a pattern need not reflect lexical accent placement in any direct way; the role of the metrical structure could have been much subtler. It is entirely possible that, as is suggested for Common Slavic in the next chapter, the assignment of accent in Italic could have been done by a separate process at this early stage.

While we have seen in Passamaquoddy (and as Halle and Vergaud (1987) suggest for Biblical Hebrew as well) a language which makes use of two independent metrical

³⁴I have skipped over some of the complicating factors found in the syncope patterns of these languages (e.g. suffixes which never undergo syncope when eligible, the syllabic status of -Cy- clusters, etc.), since they do not directly affect any of the rules postulated here. See Wilson (1989) for a fuller discussion of these issues.

structures, and more examples of this type will be forthcoming, typologically it appears to be much more common for languages with this type of metrical system to have either tonal or inherent pitch accent systems. This keeps the elements of the two subsystems of prosodic features more distinct, thus helping prevent some of the prominence clashes that languages seem to try to avoid.³⁵

Thus, if what we have proposed for the Italic family so far is correct, we can look at the debate over the nature of the Latin accent in a new light. Many of the arguments raised against the existence of pitch accent, at least in regards to Latin as spoken before the first century BC, become moot if we allow two separate prosodic systems to coexist in Latin phonology. If such processes as syncope, the organization of set phrases on rhythmic criteria, and the agreement between phonological prominence and verse ictus are seen as relating to the non-accentual metrical patterns, there is no reason to forbid the survival of the inherited free (i.e. morphologically rather than phonologically determined) IE pitch accent throughout the Common Italic period, or even later.

In the early historical period, it is clear that the originally free accent had become predictable by syllable weight in some manner similar to the effects of the familiar

³⁵Even in Passamaquoddy the two metrical structures are not completely independent, since one (the strong/weak vowel system) feeds the other (the stress grid)

Classical Period rule. Specifically, it appears that accent assignment became sensitive to the same set of determinants that governed metrical prominence. From there, it is easy to see how accent could become associated with metrical prominence itself.

This does not, however, necessarily entail any change in the phonetic realization of the accent; it could have remained primarily based on pitch. This would simply be another example of an originally free pitch accent becoming attached to a pre-existing metrical grid, as exemplified in the previous chapter. The suggested metrical structure of Common Italic (i.e., the metrical grid of Oscan and Umbrian) provides the starting point for such a change.

Two alterations in the Italic metrical rules are needed to yield the Classical Latin stress system. First, the construction of metrical feet is no longer an iterative process, but is restricted to a single metrical foot at the right margin of the phonological word.³⁶ Such a restriction is not unique, as it corresponds to quite similar changes in

³⁶Alternatively, we could take the approach suggested by Steriade (1988) for Greek (see Chapter Four for a full outline) or by Halle and Vergnaud (1987) for a large number of examples: build multiple feet from right to left, then build a right-headed word-level foot. After this structure has assigned primary prominence to the rightmost binary foot in the word, tier conflation removes all secondary accents, leaving only the single desired accent. While such a solution works in this case, it is more difficult to apply to the examples of *gers* in Russian (see Chapter Four) or Nootka (see Chapter Five). Because of this and other problems with tier conflation, I prefer the iterative/non-iterative specification for this change.

the history of Russian (see Chapter Four) and Wakashan (Chapter Five). As discussed in Chapter Two, the single foot which replaces the iterating system is found at the margin of the word from which foot construction originally began.

Second, the final syllable of Latin words is now extrametrical. Because of this change, the only metrically strong position in a word will now be the penult if it is heavy (since it will form a foot by itself) or the antepenult if the penult is light (allowing a binary foot to be formed). Note that this change brings the metrical system into direct competition with the inherited free pitch accent. Before, one generally could not identify a particular syllable as the metrical peak of a word, at least if the word had more than two syllables. Under this newer system, however, the prosodic system identifies two positions of special prominence: the "accented" High-toned syllable, and the syllable which now uniquely bears metrical prominence. The result is a split prominence system, with the incumbent pressure to resolve the prominence clash by subordinating one system to the other. In this case, the result was that the formerly free pitch accent docked onto the metrical peak of the word.

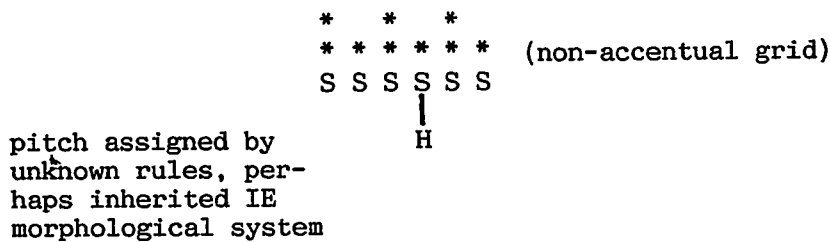
This pattern would represent the stage of Latin with a predictable pitch accent, as is apparently described in Varro, Cicero, Quintilian, and other commentators from that era. This is not to say that the accent of this period did

not involve some degree of intensity; on the contrary, this is exactly what we would expect from a now metrical pitch accent as opposed to the older inherent one. It is not surprising, then, that the accent is often brought into line with verse ictus, or that a small number of cases of syncope appear to be caused by it, or that the process of iambic shortening is still sensitive to it.

The final change would then have been the loss of high pitch as the primary marker of the placement of accent, and its subordination (and eventual replacement) by the stress-features of the restricted metrical grid. We should expect that, as pitch is de-emphasized, the "stress-like" qualities of the metrical prominence system would blossom into "full" stress accent, as is found in all of the Romance languages today. As we will see in the next chapter, the history of Greek accentuation follows a strikingly similar path.

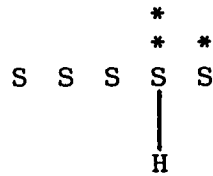
In terms of an autosegmental description, the three stages of the Italo-Latin prosodic system would be described as follows:

Italic/Early Latin



Classical Latin (up to first century BC(?); even later(?))

single metrical foot



pitched docked to
prominence within
metrical grid

Late Latin/Romance

single metrical foot



no distinctive pitch;
collapse to stress system

We can compare the dialect split found in the Bantu language Runyankore in Chapter Six and the histories of both Greek and Russian for parallel developments.

3.4 Conclusions

To summarize the arguments of this chapter, we may state the following. First, it is possible to model much of the prosodic system found in common between Latin, Oscan and Umbrian in metrical and autosegmental terms. Syncope and stress appear amenable to such an approach, but, significantly, vowel weakening in Latin appears to be based on different criteria, though an analogy to the prominence relationships within the metrical structure may play a role. We have also seen how an autosegmental account of vowel weakening points out some of the regularities between the treatment of closed syllables and diphthongs, along with resemblances between the second stage of weakening and the treatment of certain verbal alternations.

Second, it appears that the metrical account of syncope

in Italic lessens the need for the assumption of strong initial stress at this stage in the family's development. If this is true, then it is possible to see the evolution of accentual rules in Italic as being considerably more straightforward than had previously been thought. Instead of the (largely unmotivated) jump from free pitch accent in Indo-European, to fixed initial stress, and finally to mobile but predictable (ante-)penultimate stress, we can view the changes as being the result of the interaction of pre-existing features of the earlier prosodic systems.

Third, the models employed give us a framework for the discussion of the evolutionary changes just discussed. We can see the coexistence of pitch and metrical systems as the starting point for their eventual interaction, and chart the stages of the development in both metrical and autosegmental terms. This allows for a more detailed and thorough presentation of the assumptions of the theory, and opens up specific avenues for criticism and reformulation.

Fourth, though this point is not yet clear, the use of this proposed explanation of the prosodic system of Italic brings its structural resemblance to a number of other systems, both within and without the Indo-European family, into focus. Especially in regards to the rest of the IE languages, such parallels may help us to get a clearer view of the complex prosodic system which is reconstructed for the proto-language. It is always dangerous to make suggestions of possible genetic inheritance of abstract

features and structures, but enough of a similar system can be seen in Italic, Germanic, Celtic, Greek, Vedic, Baltic, and Slavic that further study on possible relationships between prosodic systems is warranted.

In terms of a general theory of prosodic change, the Italic data show a number of interesting developments. We can see the loss of iteration as a primary type of change within a metrical system, and we have what appears to be an example of change from inherent to metrical pitch accent along the lines suggested in Chapter Two. The development of extrametricality in this case is interesting, since we must assume that, at the earlier stages of the metrical system, final syllables could be weak or strong depending on their weight. To say that extrametricality was regularized here because such syllables could never stand as the heads of full binary feet really amounts to saying that they were extrametrical because they were final. Given the large number of examples of final extrametricality in the world's languages, it seems better in this case to use the phonetic weakness of final syllables as the motivation, rather than any theory internal feature.

There remains unexplained changes, of course. We have no clear motivation for the loss of iteration in Latin, nor for the different treatment of final syllables of the shape -Vs in Oscan-Umbrian and Latin. We might reasonably account for loss of iteration through a tendency for simplification, or a general erosion of elements, as is often seen in

accounts of segmental change; see the fuller discussion of this issue in Chapter Six.

Of course, a shift from initial accent (or prominence) to some sort of mobile/penultimate stress should not strike speakers of English as particularly exotic; our own language underwent the same type of change. Yet it is not possible to draw too many direct analogies between English and Latin, since the wave of changes which began in 1066 have recast our modern language in such drastic ways that we cannot show a direct evolution of Old English prosody into Modern English, as we can in the Italic/Latin example.

Still, we may wonder what Germanic as a whole has to offer as a comparison. Certainly, here was a family that maintained the older free accent long enough for the alterations of Verner's Law to become regularized; yet those very alterations may point to this accent already being realized as stress rather than pitch. The move to a fixed initial accent could be explained if we assume that Germanic inherited the same metrical structure as is found in Oscan and Umbrian, and that the fixing of the stress occurred as a resolution of prominence clash. Such ideas require careful research into the history of Germanic, with special reference to such features as the chronology of the accent shift, patterns of syncope in Gothic and other older Germanic languages, and so forth. These questions are, unfortunately, beyond the scope of the current study except in passing.

The next chapter presents short studies of the prosodic features of three Indo-European languages or groups: Vedic, Greek, and an overview of Slavic. These are presented for the purposes of comparison with out conclusions concerning Italic. They are not complete descriptions by any measure; only enough of each system is reviewed to point out the significant similarities and differences found among what appear to be related prosodic systems.

Chapter Four: Indo-European Comparisons

This chapter presents prosodic data from three additional Indo-European languages or language families, to serve as points of comparison with the description of Italic we have just suggested. In all cases, I am not attempting to "solve" the accentual and rhythmic systems of the given languages, but simply to point out the significant similarities and differences found among some of the older the Indo-European daughter languages regarding accentual typology and prosodic organization.

Section 4.1 examines accent in Vedic Sanskrit and raises some theory-internal questions concerning the role of diacritic marking of underlying accent in this language. We will also look for any evidence for the existence of metrical structure within Vedic phonology. In Section 4.2, data on Classical Greek is examined to see if the "three-syllable" rule of that language might point to similar metrical patterns as those suggested for Latin. Finally, in Section 4.3, we will review some of the facts dealing with various accentual systems found in the modern Slavic languages in order to reconstruct a common metrical grid for the Common Slavic period. Further Indo-European data are discussed in section 6.1, which presents a comparison of Irish and Welsh, but the focus there is primarily on refinements to the theory itself rather than on the languages.

4.1 Accent and Prosody in Vedic Sanskrit

In Vedic we find what has long been recognized as the

most conservative accentual system directly attested by any of the Indo-European languages. Unlike the more westerly members of the family, which have all restricted accentual placement to one degree or another (though Germanic may have maintained free accent until a relatively late period), in Vedic the older free-accent system of Indo-European has been largely retained. Neither the accentual rules nor the evidence from verse provide direct support for an underlying metrical system.¹ Still, I believe that some unusual features of Vedic phonology may indicate the possible existence of some limited type of metrical prominence.

This section is organized into three main parts. First is an overview of the accentual facts of Vedic, including a discussion of our sources of information in this area. Two main frameworks for the description of this accent will be presented, the traditional "paradigmatic" approach to both Vedic and Indo-European accentual patterns, and the more recent the model based on Garde (1976) and worked out by Kiparsky (1982) and Halle and Vergnaud (1987). The second part deals with accentual and poetic evidence for the

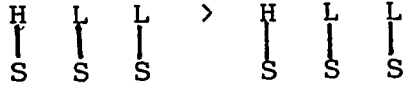
¹There have been at least three descriptions of Vedic accentuation which have specifically modelled it as a metrical structure, namely those of Halle and Mohanan (1985), Halle and Vergnaud (1987:84-88) and that of Hammond (1987:161-165). These authors go so far as to talk of the "stress rules of Vedic", a singularly inappropriate term given the important differences found between a pitch-accent system and true stress systems. As I will argue, simple directionality of accent deletion processes is not a sufficient argument for metrical prominence.

existence of metrical structure in Vedic. Finally, we will use the example provided by Vedic accentuation to contribute further evidence for ongoing debate over the proper role of diacritic accent in autosegmental description.

4.1.1 Accent in Vedic

The main sources for our information on the accentuation in Vedic are, of course, the accented texts of the Vedas themselves; two of the Brahmanas, the Taittiriya and the Satapatha, are also accented. While there are at least four methods for marking the place and nature of the accent employed in the various texts (Macdonnell (1915:448-451) has a summary), that used in the Rig-Veda, and the most commonly used in general, involves a set of marks above and below the written line. Interestingly, the syllable that we would think of as accented is not itself marked. Rather, the pre-tonic syllable is marked as low, while the post-tonic syllable is, in general, marked with a falling tone. Thus, the accented syllable would appear to carry a High tone, or perhaps a Rising tone.

If we assume that the accent corresponds to a High tone (called udatta or "raised" in the Sanskrit grammarians), and that most accent syllables were Low-toned (anudatta or "unraised"), then the falling tone which normally occurs after the accented syllable (called svarita, 'sounded') would arise from a spreading of the High-tone accent onto the following Low syllable:



Such spread creates a so-called "secondary svarita", that is, a Falling tone predictable from the previous High tone. The inclusion of the second Low-toned syllable in the rule above is necessary, as the spread of the High tone is blocked if another High-toned (i.e. accented) syllable immediately follows. This would appear to be a restriction against three adjacent syllables all being associated with High tones (cf. the exact parallel of Middle Korean in Section 6.2).²

In addition to these secondary svaritas, the Sanskrit grammarians also describe "primary svaritas", created by the contraction of an accented vowel with a following unaccented vowel (or, more accurately, the writing of the first vowel in a sequence as a glide).³ Thus, the svarita itself is never an underlying accent, any more than the circumflex and acute accents need to be distinguished in the underlying description of Greek. The assignment of accent in Vedic is normally equivalent to the assignment of High tone (but see

²Though Macdonnell (1915:449 fn. 1) mentions that this might be simply a orthographic feature, in that marking the svarita in this position would not allow the marking of the anudatta before the next accented syllable. I prefer to follow Whitney (1889:29) who cites the Indian grammarians for support of the interpretation of this absence as a real phonetic fact.

³If it is the second contracted vowel which is accented, the result is a normal udatta accented vowel. Also compare the treatment of accented vowels which lose their syllabicity before another vowel, and thus their ability to bear the accent: /asyam/ 'mouth', phonetically [asiam] vs. /agnyos/ 'fire' (dual gen.-loc.) from agni-.

4.1.3).

The tonal nature of this accent is underlined by its lack of stress-like segmental effects. The accent does not directly cause syncope, vowel-lengthening or shortening, reduction, or any other process common with stress accents; nor does it appear to play a role in Vedic metrics. Vedic thus stands in sharp contrast to Italic and Celtic in these regards, and as a textbook example of inherent pitch accent, comparable to Japanese in many ways.

In general, a phonological word will have one and only one accented syllable. Most types of compounds are treated as a single phonological word for the purposes of accent, though some types of dvandva compounds and tatpuruṣa compounds are exceptions, carrying a double accent (Whitney 1889:486, 491).

Besides the forms which contain more than one accent, there are a number of categories of words which do not bear any surface accent, at least under some conditions. Enclitic pronouns and particles present no particular difficulty, since they can be assumed to form a single phonological word with the preceding element. Nouns in the vocative case are unaccented unless in clause- (or verse-) initial position, where they universally receive an accent on their first syllable. Finite verbs in main clauses are unaccented unless

in initial position⁴. In contrast to vocatives, finite verbs when accented do not have a fixed placement for accent, but are subject to the same morphological rules of accent placement found in nouns and other inflected forms. Non-finite verb forms and verbs in relative clauses are always accented.

Subject to the above, the single lexical accent of a Vedic word can theoretically appear on any syllable. It is not restricted by any conditions of syllable weight, distance from the word end, or vowel length. Thus the system is much closer to that found in Balto-Slavic and Proto-Germanic (as well as in our reconstructions of Indo-European itself) than to the more constrained systems of Italic, Greek and Celtic.

Before any further discussion of the details of Vedic accentuation, a few basic facts of Vedic morphology should be reviewed. An underived Vedic word consists of a root, followed in some cases by a thematic vowel, followed by one or more suffixes. In verbal morphology, a large number of prefixes, and a small number of infixes are found, and reduplication occurs regularly in a number of forms. Syncope and lengthening rules, largely connected to the ablaut patterns of Indo-European, can be triggered by both phonological and (primarily) morphological conditions.

Despite this freedom of placement, it is clear that

⁴There are further, more syntactically complicated, conditions under which a verb may receive an accent, which I will not include in the present discussion.

within a given paradigm, the Vedic accent follows one of a small number of patterns. These "accentual curves" have long been recognized, and have led to the division of inflectional endings as belonging to one of two phonological classes: weak and strong. Weak endings never carry the accent; strong endings may or may not carry the accent depending on the accentual type of the root to which they are attached. In general, there are some nominal roots which retain the accent throughout the paradigm (so-called columnar initial accent); others never bear the accent (except by default in the vocative, since such accent must fall on the initial syllable), which instead falls on the thematic marker or some other stem-suffix; and others show a mobile pattern, with the accent falling on the last syllable of the stem when it is followed by weak suffixes, and on the suffixes themselves when they are strong. Verbs (when accented at all) show a very similar pattern, with those of the second conjugation, or /a/-Conjugation showing fixed initial accent, and most other types having mobile accent.

These patterns in underived forms are quite regular and do not in themselves require much analysis. The situation becomes much more complex when we begin to examine the accentual role of derivational suffixes. Some of the suffixes appear to bear the lexical accent regardless of the normal accentual curve of the underived form. If more than one such suffix is present in a word, it is the last suffix which carries the accent. In other cases, the accent appears

to shift onto a given suffix only if it would normally appear one syllable before such a suffix (as is true with the genitive plural suffix -nam in certain formations). Other derivational suffixes do not affect the normal accentual placement.

Two basic approaches have been taken toward explaining (or, at least, codifying) the rules for accentuation in Vedic. The first has viewed the placement of accent from primarily a paradigmatic viewpoint, much as I have done in the preceding summary. This type of description can be seen in the work of Kurylowicz (1958, 1968), Rix (1976) and most earlier work on Indo-European accent. If we use Kurylowicz's terminology, the major division in Vedic accentuation patterns is between mobile and columnar. The first type is found primarily in monosyllabic root nouns (i.e. those in which the case endings are attached directly to the root, without thematic vowel or other stem-derivative). The second is regular for all thematic nouns, and in many other non-root nouns (e.g. certain participles). We can compare the paradigms for the nouns ruk 'light' and kama 'love' in the singular:

	<u>ruk</u>	<u>kama</u>
Nominative	rúk	kám-a-s
Accusative	rúc-am	kám-a-m
Instrumental	ruc-á	kám-e-na ⁵

⁵The change of /a/ to /e/ in this form is regular, but unexplained.

Dative	ruc-é	kām-ā-ya
Ablative	ruc-áh	kām-ā-t
Genitive	ruc-áh	kām-a-sya
Locative	ruc-í	kām-e (< a+i)

The difference in the endings of the two forms is based on the thematic/athematic distinction (as well as gender) and not on accentual patterns. The example of columnar accent could have also been chosen to show regular accent of the thematic vowel, as in the forms of the stem agni- 'fire', in which the second-syllable accent is retained throughout the paradigm, except in cases where the final /i/ becomes a glide. Kurylowicz assumes that mobile accent was the norm in Indo-European, with columnar accent arising from a re-analysis of the patterns due to the loss of vocalic resonants in some forms. Without going into the details of his theory, the loss of resonants due to ablaut would have originally created coincidental cases of columnar accent, which would have then been regularized throughout the declensional pattern.

This approach has a long and distinguished history, and has allowed us to make a number of interesting generalizations, such as the observation that, within nominal paradigms, accent never falls further to the left in any form than it does in the nominative. However, within the synchronic analysis of Vedic accent, such an approach is overly descriptive, and does not take a sufficiently abstract approach to allow for significant statements about the

mechanisms of Vedic accentual change. We turn, then, to the second approach, that of (primarily) Kiparsky and Halle. It is this model which will serve as the starting point for the further discussion of comparative issues.

In this framework, accent placement is viewed not as a curve within a paradigm, but rather as a cumulative lexical feature determined by the accentual status of each individual morpheme within a word. Each morpheme may be underlyingly accented, pre-accenting (assigning an accent to the last syllable of the preceding morpheme), or unaccented (though Halle & Vergnaud appear to do without pre-accenting forms). Rules of accent addition and deletion then apply until, in most cases, a single accent survives.

When dealing with derivational morphology, it is further necessary to divide suffixes into "dominant" and "recessive" types. Dominant suffixes delete all preceding accents, whether they themselves are accented, preaccenting or unaccented. Recessive suffixes do not affect preceding accents, and again may belong to any of the three accentual categories.

Kiparsky sets his explanation for Vedic accentuation within the framework of Lexical phonology (Kiparsky (1982); Mohanan (1982)). In such a model, it is assumed that phonological and morphological rules may be interspersed, rather than necessarily applying as two distinct blocks. Rules are instead segregated into strata, that is, sets of rules which apply in similar ways. The two most important

strata are the lexical and post-lexical rules. While there are a number of important differences between the two types of rules, the crucial distinction for the current discussion is that of cyclicity. Lexical rules are assumed to apply in a cycle, with each application of a rule taking precedence over previous applications. Thus, for example, stress rules may apply several times in a derivation, with each iteration subordinating the stresses assigned on the the previous cycles. Post-lexical rules, on the other hand, are assumed to apply all at once, and to leave structure built by the earlier rules untouched.

Within Vedic, these two types of rules apply to two strata of suffixes, which Kiparsky simply labels Stratum I suffixes and Stratum II suffixes. For the purposes of accentual placement, Stratum I suffixes are added cyclically, with the accentual rules reapplying as each suffix is attached. After all Suffix I suffixes have been added, all Stratum II suffixes are added at once, and do not affect the placement of accent determined at the end of the cycle.

This is the main claim of Kiparsky's model, that the dominance or recessiveness of any given suffix does not need to be underlyingly marked; rather, it is a natural outcome of the difference between cyclic and post-cyclic rules. We only need to know two things about a given Vedic morpheme: first, is it unaccented, accented, or preaccenting?; and second, does it belong to Stratum I or Stratum II of the morphology? While it might at first seem that Stratum I and Stratum II

are simply alternative terms for dominant and recessive respectively, the theory of Lexical Phonology claims that all Stratum I suffixes must precede all Stratum II suffixes, thus accounting for two features at once.

In general outline, Kiparsky's model will work for Vedic in the following way: we begin with a lexical root, which may be either accented or unaccented. We add Stratum I suffixes one at a time; these may be accented, unaccented, or preaccenting. Regardless of the accentual type of the newest suffix, the accents assigned on all previous cycles are deleted (this is an automatic result of cyclical application in Lexical Phonology). After each suffix is added, the Basic Accentuation Principle (BAP) applies. The BAP assigns initial accent if the form contains no accented morphemes (in practice, this is equivalent to the last morpheme being unaccented). Thus, when the last stratum I suffix has been added, only two accent patterns are possible. If the last suffix is accented, it retains its accent; otherwise, initial accent is assigned.

The one exception to this procedure is a stem consisting entirely of an unaccented root. In this case, since no derivation has occurred, the Strict Cycle Condition prevents the BAP from applying, and the root passes to the next stage of the morphology with no accent assigned (see Halle & Vergnaud (1987) for a clear discussion of this point).

At this point, the cycle stops, and all Stratum II suffixes are added at once. In most cases, the stem will

already carry an accent, and a second clause of the Basic Accentuation Principle will delete all accents after the first. The only case in which Stratum II accent will surface is with the unaccented underived root mentioned above. While this may appear to be a single exceptional pattern, it in fact accounts for all of the numerous cases of mobile accent in nominal and verbal paradigms.

Let us examine some examples of derivation in Vedic within Kiparsky's framework to better understand how his framework accounts for the observed accent (examples from Kiparsky (1982); the left arrow indicates a preaccenting morpheme):

Lexical entry:	/puruṣa/	/ad/	/sar/
Stratum I			
Accent Deletion	--	-	-
BAP	puruṣa	-	-
Suffixation	puruṣa+ta	-	sar+as
Accent Deletion	puruṣata	-	-
BAP	--	-	saras
Stratum II			
BAP	--	-	-
Suffixation	puruṣata+nam	ad+ant	saras+vant
BAP	puruṣatanam	-	sarasvant
Suffixation	--	adant+i	sarasvant+ī
BAP	--	-	-
Suffixation	--	adanti+nam	sarasvantī+vant
Ablaut, BAP	--	adatinam	sarasvatīvant
Suffixation	--	-	saravatīvant+am
Ablaut, BAP	--	-	saravatīvatam

The final output of these rules is thus puruṣatanam, 'of human natures', adatinam 'of those (fem.) eating', and sarasvatīvatam 'of those (fem.) accompanied by Sarasvati'

(the loss of /n/ in the two suffixes -vant in the final example is a regular ablaut process). Notice that, while the Level II suffixes are listed with separate applications to clarify the processes involved, they just as easily could have been added all at once.

Finally, Kiparsky examines compounds with inflected first members. He finds that they fall into two major classes. The first type carries two accents, and were mentioned above. Since these forms function in some ways like phrases and in others like single phonological words, Kiparsky must have his strata of rules apply partially in the "wrong" order in order to account for them. This he does by following Mohannan's (1982) lead in allowing rules recursion in some post-lexical compounds.

The second type of compound, those having a single accent on the second member, often have an unusual morphology in the first member. These special endings can be taken as accent deleting, thus yielding the correct results.

Kiparsky's model has a number of strengths which should be recognized. Primarily, and in contrast to earlier approaches, it derives the accent of the phonological word from information carried by all of the morphemes, not just a single suffix. This greatly increases the predictive power of the theory. Accent in compounds is handled in a straightforward manner, being derived from the same principles established for single words. Finally, it accounts for the difference between dominant and recessive

suffixes systematically, and does not require specific labelling of each morpheme with regards to this distinction.

Many areas of Vedic accentology, including many of the more complicated and interesting, were not covered in Kiparsky's work. These include the accentual effects of reduplication, the verbal augment and other prefixes, cases of regular accent shift with semantic correlates, and the whole question of surface tone vs. underlying accent. The most interesting of these areas will be reviewed in the next section. First, however, it will be necessary to point out some of the problems with the Kiparsky's proposal.

There are three primary drawbacks to the lexical phonology model of Vedic accent. First, it requires the use of a general rule of metatony in order to handle the assumed "accent shift" from accented "weak" suffixes onto thematic vowels:

$S \rightarrow S / [S _ [-cont] S]_{\text{noun, adjective}}$

In other words, accent shifts off a consonant-initial suffix to the second syllable of a bisyllabic stem. While such a rule would be acceptable as a minor clean-up stipulation, this rule is necessary to account for half the case forms of a typical thematic vowel.

A second problem is that the strict correspondence between the two proposed strata of suffixes, and their order within words, which lies at the heart of this approach, cannot be maintained without exceptions. There are counterexamples to Kiparsky's claim that all dominant

suffixes will precede all recessive suffixes. We have, for example, such derived forms as devītvá "state of goddesshood", in which dominant -tva must follow the recessive "devi-class" suffix -ī.⁶ A parallel case is devītamā, with the same meaning, in which final feminine -a is dominant, but follows recessive -tama. Here, however, the case is confused by the existence of the suffix -tama with dominant final accent, used to make ordinal numbers: śatatama 'one hundredth (masc.)'; śatatamī 'one hundredth (fem.)' (compare śata- 'one hundred'). Kiparsky could argue that -tama 'superlative' and -tama 'ordinal marker' were two separate suffixes, though both ancient and modern grammarians have identified them as one and the same.

Even more counterexamples occur if one is unwilling to accept Kiparsky's division of such suffixes as -ī, -tara and -tar into two distinct morphemes. Such a division is not assumed in any source known to me. The main problem with such an approach, besides the multiplication of homophonous suffixes, is that it loses a generalization which can be made concerning regular accent shifts. This can be illustrated using the suffix -tar.

Two accent patterns are seen in derivatives in -tar. In some cases the suffix takes the accent, in others accent

⁶Since Kiparsky assumes the existence of two otherwise identical -ī suffixes, one dominant and one recessive, it could be argued that in this case we have the dominant, so-called vrkī suffix. Yet do we really want to say the the -ī in devītvā is a different -ī than in the simple devī?

falls on the initial syllable. As we have mentioned, there is a regular semantic correspondence to this alternation. The suffix-accented forms are masculine agent nouns, such as datár 'giver'. The initial-accented forms are participial in meaning, such as dátar 'giving' (that is, they are neuter action nouns). This second type must be dominant unaccented in order to get consistent initial accent. Thus, Kiparsky must assume two underlying suffixes, both dominant, to generate the differences between the forms.

A more productive approach is to assume a process of root-final accentuation with a disambiguating function. The relationship between the nomen agentis and nomen actionis here is one example of such a function. Another can be found in such forms as jyesthá- 'eldest' and kaniṣṭhá- 'youngest'. These two very common superlatives contrast with all others in -iṣṭha, which have initial accent (clearly the original accentuation, if we take Greek -istos with recessive accent as evidence; see the next section of this chapter). The final accent in these forms is unaccountable, unless it serves to distinguish them from the otherwise homophonous jyēṣṭha 'greatest' and kāniṣṭha 'smallest', both with the expected accent. Rather than multiply suffixes, it is important to take such semantic functions into account.

I will not undertake, in what is basically a comparative review, to set up an alternative model of Vedic accent. However, a few observations along the lines of a minor repair of Kiparsky's theory are in order. I will also present some

reasons for rejecting the metrical model presented by Halle & Vergnaud and reformalized by Hammond.

We begin with a set of generalizations concerning accentual patterns that are often overlooked. The first is that thematic vowels appear to be universally accented underlyingly, and very few polysyllabic stems show mobile accent at all. Of those that do, the majority are present participles, or a few adjectives which have the form of a participle (e.g. mahata, brhatas). There is a tendency for accent to shift from stem final /ī/, /ū̄/, or /r̄/ in certain cases, but in general a polysyllabic stem will never lose its accent to any following inflectional suffixes.

Monosyllabic stems, on the other hand, almost never are able to retain accent throughout the paradigm; the stems in -a being the only clear exceptions (so jā 'progeny' has fixed initial accent, while dhī 'thought', and bhū 'earth', which otherwise are similarly declined, show mobile accent). That it is a matter of syllable count, and not any segmental features, can be shown by comparing identically declined forms such as vak- 'voice' with marut- 'wind god' or trivrt- 'three-fold', the first with mobile accent, the second two with fixed second-syllable accent. These types of regularities have long been discussed under the older approach to Vedic accent, but are missed by some of the newer models.

I believe these facts play an important role in helping to do away with the rule of metatony suggested by Kiparsky.

In order to account for such patterns as are found in the roots pad- 'foot' and pitar- 'father':

Acc. singular	<u>pād-am</u>	<u>pitár-am</u>
Instrumental sg.	<u>pad-á</u>	<u>pitṛ-á</u>
Instrumental pl.	<u>pad-bhís</u>	<u>pitṛ-bhis</u>
Genitive pl.	<u>pad-ám</u>	<u>pitṛ-nám</u>

The alternation -am/-nam in the genitive plural is regular, and is based on whether the preceding stem is consonant or vowel final. In Kiparsky's analysis, the acc. sg. suffix is preaccenting, while all the others are accented; both roots are assumed to be unaccented.⁷ In order to explain the accent of pitṛbhis rather than expected *pitṛbhís, Kiparsky invokes the rule of metatony mentioned earlier, which shifts the accent in this case. This solution, however, misses two major generalities.

The first involves a general rejection of accent from stem-final vocal resonants. Not only do we see cases of shift before the genitive plural suffix (Whitney 1889:110), but before suffixes such as possessive -mant/-vant and comparative -tara/-tama. Thus, I would argue that it is not the Instr. pl. form pitṛbhis which requires special treatment, but the genitive pl. pitṛnám, rather than expected

⁷Since the case endings are recessive, it would seem that both of these roots should have received initial accent by the BAP at the end of stratum one. However, the Strict Cycle convention operates to prevent an underived root from being effected by any rule of the cycle that would add a disinctive feature, and both roots thus reach stratum two without accent.

*pitṛnām. Our rule of accent shift does exactly that.

Moreover, in bahuvrihi and tatpuruṣa compounds in which the first member would normally bear the accent, we regularly find accent on the second member instead of the first member would have had the accent on a stem-final vocalic resonant. Interestingly, the accent does not shift to a predictable position within the second member, but moves to the syllable which would be expected to carry the accent if the word were uncompounded. Because of this fact, Kiparsky rejects the accent shift solution to this problem, and suggests an accent deletion rule followed by a re-application of the Basic Accentuation Principle to the compound as a whole, since "[i]t is not clear...how a phonetic accent shift could "find" the inherently accented syllable of the second member in compounds (1982:25)." I will suggest below that, if we distinguish underlying accent from surface tone, this is in fact exactly what we would expect.

The second generalization missed in the metatony account is the accentuation of such forms as pitṛā. Since Kiparsky assumes accent on the recessive suffix here, he must take the stem as unaccented. But the placement of accent in such forms does not argue against a stem pitṛ-, since it is clear that in cases of accent-bearing syllabic segments desyllabifying, the accent moves to the immediately following vowel. Thus, there is no reason for us not to assume an

accented stem here.⁸

In fact, if we assume that the weak case endings are unaccented, and the strong case endings are simply accented (rather than preaccenting), I can find no examples in any derivational pattern which requires a pre-accenting morpheme. What is required instead is a general statement about stem structure: the minimum size for an accented stem in Vedic is two syllables. Moreover, all polysyllabic stems must have an accent. This explains the different treatment of monosyllabic and polysyllabic stems of the same declensional type.

A difficult category of words for this approach are the present participles. These are polysyllabic stems in -ant, but if accented on that morpheme, they show mobile accent. Thus, while a form such as bhavant (< bhu 'to be') has fixed initial accent and thus indicates an accented root, a form such as adant 'eating' has mobile accent. We can compare forms in -mant, such as paśumant- 'possessing cattle', which show no shift of the accent to the case endings. Under Kiparsky's model, these participles are no problem, since the strong endings are assumed to be preaccenting (he must assume

⁸One of the claims made by Kiparsky concerning the metatony rule is that it allows the easy formulation of an ablaut rule, amounting to "delete an unaccented /a/ in pretonic position before a continuant" (this is my formulation of the rule). However, Kurylowicz (1968) has, I believe, proved that ablaut cannot be seen as the result of accent in the older Indo-European languages, but rather as a parallel process. In this case, I would argue that the ablaut of pitar-nam to pitṛnam allows the accent shift, rather than being conditioned by it.

a dominant pre-accenting zero suffix underlying nom. sg. adan, however).

A clue to the solution of this problem comes from the accent found in the neuter dual Nom.-Acc. and in the feminine derivative in -i. In both cases, the accent is determined by the ablaut grade of the stem: neuter N-A either adántāu or adati; feminines either tudánti or tudati, etc. It would thus appear that the surface accent patterns in these forms have been restructured to be dependent on the ablaut pattern rather than the original underlying accents.

The last problem which requires comment is the apparent multiplication of recessive and dominant homophonous morphemes. Rather than assume a cyclic application with no interweaving of suffixes, I would suggest that the deletion shown by so-called dominant suffixes is based on the type of derivation which that suffix is performing. In Vedic, as in many languages, a distinction is made between primary (or "close", or "stem-level") derivation, and secondary ("loose" or "word-level") derivation. Most suffixes may only perform one type or another, but many (especially the gender marking derivational markers) may appear on either level. It is not surprising that stem-level derivation can shift or delete accents, since Vedic apparently has accentual constraints applying specifically to the stem as a unit (see below).

The treatment of the feminine -i derivatives presents an interesting case. Forms such as vrki 'she-wolf' have the accent on the -i suffix in all forms. Many other feminines

from underived nominal roots are also found, such as mayurī́ 'peahen' and kumarī́ 'girl (cf. kūmāra- and māyura-). In such forms, the suffix is clearly "dominant", i.e., used as a stem- rather than a word-level suffix. In derived forms, however, the same suffix is often "recessive" or word-level: pārthivī́ 'terrestrial', havyavahanī́ 'oblation-carrying'. There are a number of exceptions to this latter generalization, where derived stems still take the dominant form, but the general pattern matches the prediction of seeing accent dominance as a reflex of stem vs. word level affixation.

The form pārthivī́ is especially instructive of this point, since it contrasts with (and is ultimately derived from) prthivī́ 'earth', with final accent. This form is itself an -ī́ derivative from prthu- 'broad' (derived from prath- 'spread out'). So, in the original feminine noun, we find the expect stem-level suffix retaining its own accent. The masculine derivative in -a from the same root is pārthiva, with initial accent showing an unaccented stem-level suffix. On the new stem partiv- we then build pārthivī́, with the word-level form of the suffix and the expected initial accent. Thus, the two uses of the -ī́ derivative clear display the accentual properties associated with primary derivation (stem-level) vs. simple gender marking (word level).

To summarize: I would argue for a model of Vedic accent which allowed only two underlying markings of morphemes,

accented or unaccented. The distinction between dominant and recessive suffixes is a functional rather than a categorical one; suffixes delete previous accents when they are used for primary (stem-level) derivation, and do not cause deletion when they are used for secondary (word-level) derivation. Minimum syllabic domains account for the difference between monosyllabic and polysyllabic stems. This point leads us into the next part of this section.

4.1.2 Metrical structure in Vedic

This part of our discussion has something of two equal and opposite goals. The first is to show that Vedic does not have metrical structure, at least not the metrical structure that has been assigned to it so far. The second goal is to show that Vedic does have metrical structure, but of a much more limited type.

Halle & Vergnaud (1987) give a brief outline of a metrical model of Vedic accent. Starting from a slightly revised version of Kiparsky's model as presented above, they suggest the following formalization. Accented morphemes have a level one asterisk in their underlying description, while unaccented morphemes have only a level zero asterisk. As each dominant suffix is added, the Stress Erasure Convention applies:

In the input to the rules of cyclic strata, information about stress generated on previous passes through the cyclic rules is carried over only if the affixed constituent is itself a domain for the cyclic stress rules. If the affixed constituent is not a domain for the cyclic stress rules, information about stresses assigned on previous passes is erased. (p. 83).

In other words, unless the phonological string being added on a given cycle can in and of itself undergo the rules of stress assignment (e.g. the second member of a compound, or the English suffix -oid in molluscoid, etc.), all previous structure built on earlier cycles is erased.

Thus, since Vedic suffixes themselves are not domains for the application of the "stress rule", after the last dominant suffix is added, a Vedic word will either have a single level one asterisk at the right margin of the phonological string, or none at all. At this point, the metrical equivalent to the BAP builds a left-headed unbounded foot, in which level one asterisks may not be in weak positions (I paraphrase Halle & Vergnaud's terminology). If the last morpheme was accented, it will constitute the foot on its own (a); if there are no accents, the foot will extend to the left-margin, and assign a level 1 asterisk to the initial syllable (b):

(a)	1	*	*	*	*	*	*	(*)	(b)	1	(*))	
	0	*	*	*	*	*	*	*		0	*	*	*	*	*	*	*
		S	S	S	S	S	S				S	S	S	S	S	S	

Strict Cyclicity will still prevent the BAP from applying to an underived root, allowing it to pass to the post-cyclic stratum without an accent. All recessive suffixes are now added, any number of which may add accents to the string. The BAP then applies again, giving highest prominence, or assigning initial prominence if there is still no accent. Finally, Tier Conflation eliminates all remaining non-primary accents, yielding the single Vedic udatta.

What does this use of metrical terminology gain us? I would argue that it provides no real insight into any interesting questions about Vedic accent. In addition to the criticisms made earlier concerning Kiparsky's approach, many of which carry over to the Halle & Vergnaud model, the use of unbounded feet here appears to be vacuous. Once the rules of dominance have found the stem-level accent, the left-headed unbounded foot is simply a way to say "left-accent wins". There is no metrical constituency, no alternating patterns that require explanation, no "in-foot/ out of foot" distinctions, in short, very little for the proposed metrical structure to do.

Hammond (1987) reworks the Halle & Vergnaud system so that it works within his "arboreal grid" system, but the changes proposed are basically cosmetic. The cycle, rather than the metrical structure itself, is still used to find the most prominent dominant accent, and an unbounded left-headed foot still applies relatively vacuously.

It would appear that the attempts to apply metrical structure to Vedic have begun on the wrong foot (so to speak); both Halle & Vergnaud and Hammond treat Vedic as if it were a stress language. Instead, I believe we will get a clearer picture of what metrical structure does exist in Vedic if we begin by treating it as a pitch accent system.

There is no evidence that the patterns of accent deletion found in Vedic, either by the rightmost dominant

suffix or the leftmost final accent, is motivated by metrical structure. There are no segmental effects to the accent (not even ablaut, I would argue); the accent plays no role in Vedic meter, which appears to be syllable counting and weight-sensitive; in short, it just doesn't look like a metrical prominence at all. Rather, we should compare accent deletion in Vedic to similar processes found in tonal languages, and in such languages as Japanese. The general Niger-Congo process known as Meussen's Rule, in which all High tones in a continuous string within a word are deleted except for the first, or accent deletion in Japanese, which also permits only the leftmost accent to survive, are perfect analogies to the situation in Vedic. Yet these systems are not analyzed with metrical structure (or, at least not for this purpose).

If we were to take a more pitch-oriented view of Vedic, we might suggest that surface accent consists of the association of a floating High tone with an underlying marker of accent. If we make our floating tone a left-boundary tone, we automatically explain the default assignment of initial accent; unless there is an accent present in the phonological domain to attract the boundary tone, the rules of autosegmental association will map the High tone onto the initial syllable. In this way, the only accent deletion needed is within the stem, that is, as a result of primary derivation. Since the High tone will automatically associate with the leftmost accent among the stem accents, or be

assigned by default to the initial syllable, the accents of word-level suffixes will not matter in most cases, since, without a High tone to associate with, they will have no surface realization.⁹

The one exception is the underived monosyllabic root, which will still not have an accent at this point. This is, I believe, where meaningful metrical structure can be employed for Vedic. Our monosyllabic vs. polysyllabic distinction for accentuation of stems can be captured by assuming that a single binary metrical foot at the left margin of the word acts as a kind of "prosodic filter" for the tone-assignment rules. Parallel to the minimum length rules for words and morphemes in a variety of languages (e.g. some dialects of Japanese: Martin (1987)), this metrical foot acts as a minimal template for accentable stems. Thus, underived monosyllabic roots are unable to make accentual distinctions, or even receive default accent, until either (a) word-level suffixes added to the root fulfill the minimum length requirement, or (b) the root remains underived through the entire derivation. Only in this case can accent be assigned to such a form, by an assumed default assign at the very end of the lexical morphology. It is interesting to observe that there are no accented monosyllabic nouns in Vedic with short vowels, in line with Allen's (1973) argument

⁹As we will see in the next part of the discussion, there is still some reason to assume that these accents are, in fact, deleted and not just ignored.

about the impermissability of accented light syllables in some languages.¹⁰

If this proposed metrical foot were only needed to account for lack of monosyllabic accent, it would be justifiably ruled ad hoc. However, I believe there are at least two other patterns which this foot can help to explain. First, we have already mentioned the absence of unaccented bisyllabic roots. This can be accounted for by assuming that the metrical foot assigns default accent to the second syllable of such a root if the initial syllable is not accented. This default assignment of second-syllable accent accounts for such forms as marut- and trivrt-. Notice that the assignment of second-syllable accent can be overridden by later stem-level suffixes, which can delete preceding asterisks within the stem. If this leaves the stem with no accents at all, the result will be tonal association with the initial syllable.

The second pattern, related to the first, is the treatment of thematic vowels in Vedic. For accentual purposes, they are considered to be part of a bisyllabic root rather than a stem derivative. Thus kamam 'love' (acc. sg.) is analyzed as kama + m rather than kam + a + m, though such a division is not at all unexpected given the general

¹⁰An alternative solution, to make the initial syllable extrametrical, has some advantages, but does not seem workable. Primarily, it does not explain the requirement that polysyllables have accent.

morphological patterns of Vedic. If this were not the case, then the thematic vowels, as dominant (or stem-level) suffixes, should delete initial accents and make forms like kamam impossible. Instead, I would argue that thematic vowels have a special status among stem-level suffixes because of the limitations on their position; they must stand immediately after the root, and will thus always be part of the metrical foot. This also explains their regular accent in forms with unaccented roots, since they would be assigned metrical accent as described above. This model thus helps to simplify a number of complexities in Vedic stem morphology.

It would be tempting to using some type of metrical structure to account for ablaut in Vedic, since metrical models were useful in treating syncope in Italic. The Vedic patterns, however, show none of the alternating patterns exhibited by the Italic syncope, and are related to accentual phenomenon only to the extent that are both sensitive to the same morphological conditions. Thus, the initial "accentual-licensing" foot may be the only hint of metrical structure in Vedic.

Even if so, however, it is still of great interest given the patterns we have seen in other Indo-European languages. Could this word-initial metrical foot be a parallel to the initial foot of Latin, or for the similar foot found in Old Irish (see 6.1)? While it would be satisfying to tie all such IE phenomena together, it would seem that the safe answer is no. While Latin and Old Irish show a number of

similarities between their stress systems, there is little that can be found to connect this very different kind of metrical prominence in Vedic to a common model. One might simply point out that the metrical foot proposed for Vedic is right-headed, while that of Latin and Old Irish is left-headed, not a trivial difference. Of course, if it could be shown that Indo-European had such a structure, it might be possible to associate it with later changes in the metrical patterns of the western languages, but here speculation gives way to folly.

Instead, we might make a typological comparison of the Vedic foot to the quite similar initial foot suggested for Japanese in section 6.2. Since the overall prosodic system of these two languages are remarkably parallel in the overall application (and moreso between Vedic and some non-standard Japanese dialects), it may be significant that we can now posit similar foot structure in both cases.

4.1.3 The role of diacritic accent in Vedic

Having made the argument for the treatment of Vedic as an inherent pitch-accent system, it is now necessary to comment brief on the use of diacritic accent in the description of the language. It could certainly be claimed that such accent is unnecessary, especially given the earlier dismissal of the ablaut rule proposed by Kiparsky. Since it is just as easy to delete and shift High tone as accent (some might argue, even easier), we should be able to reanalyze accent as pre-attached High tone, and rewrite our rules on

that basis.

If the facts presented in the earlier parts of this discussion were the only ones which needed to be addressed, this would clearly be the case. However, Vedic shows an intriguing alternation between tonic and clitic forms of a number of classes of words, which adds support for the use of both accent and tone in the description of accent.

As mentioned above, finite verbs in main clauses normally do not have surface accent. They will show such accent if in clause or verse initial position, or if a preverb is attached. In these cases, the accent appears in a position determined by the same type of morphological conditions which apply to nouns. Thus, some verbs will show columnar accent, others mobile, there are strong and weak case endings, etc. In subordinate clauses, verbs are regularly accented.

Nominal forms in the vocative case are also generally unaccented unless in initial position. Unlike verbs, however, all vocatives without exception acquire initial accent when they stand in such position; there is no internal accentual structure within these forms. It should be mentioned that, unlike some languages, Vedic can have vocatives of considerable length, and not just bare roots.

The patterns shown by verbs indicates that we cannot speak of such forms as simply "accented" or "unaccented"; we must instead speak of an accentual pattern which may or may not be realized on the surface through the association of

High tone. The underlying prominence relationships are there, but as abstract relationships, not phonetic markers. The distribution of underlying accent and High tone can thus be described in the following chart:

	inherent H-tone	no inherent H-tone
+ underlying accent	most tonic words	finite verbs compounded forms
- underlying accent	some preverbs, monosyllabic stems	vocatives clitics

Let us look at the four possible categories one at a time. Most non-clitic forms will have at least one underlying accent present at some time in their derivation. Of course, it is entirely possible to put together a form without any accented morphemes, or to remove all such accents through stem-level deletion processes; in these cases, the forms are treated identically to the +High tone, -accent forms (i.e. the vocatives) and receive default High tone. Note that we must now specifically note the presence of the left boundary High tone in such words, as it no longer appears automatically.

Finite verbs can then be assumed to undergo the same accentual rules as do nouns, but lack the inherent High boundary tone to realize that accentual pattern. We may also assume that clause or verse left margins provide such a High tone, allowing the attachment of high pitch to the proper syllable of a verbal form. Thus, rather than assuming that finite verbs lose their accent in non-initial position, this model allows us to say that their accent is suppressed until

provided a tonal marker in some way.

The inclusion of compounded forms here is not technically correct, since the unaccented members of nominal compounds began with an inherent high tone, which was lost in the process of compounding. However, the overall pattern is then the same: if a tone is introduced into the prosodic domain of the word (e.g. by shifting tone off of a final syllabic resonant in the first member), the tone attaches to the inherently accented syllable of the compounded word.

We have already discussed the treatment of the High-toned but unaccented words; these will receive default initial tone unless, as with preverbs, they become part of a large prosodic domain which contains accented syllables. Finally, the vocatives and clitics have no underlying prosodic features. Clitics will, by definition, become part of a larger phonological string, but vocatives may surface with no accent at all. Even in initial position, where the same clause-initial High tone is able to associate with them, there is no accentual marking to distinguish any given syllable. The result is regular initial High tone in these forms.

Note that this analysis would not be possible using a pre-attached tone model of accent. While it would be elegant to be able to do away with the underlying asterisks in Vedic phonology, doing so would, I believe, cause us to miss some of the important distinction made by the prosodic system between different morphological categories.

4.2 Accent and Prosody in Classical Greek

The prosodic system of Classical Greek has long been recognized as, after Vedic and (in some ways) Balto-Slavic, the most conservative among IE languages. This judgment is based primarily on the general agreement in the placement of nominal accent between Greek and the other languages in which free accent was maintained, and Greek's retention of pitch accent rather than stress. However, between the assumed Indo-European system and the attested Greek prosodic system, three major changes have occurred.

First, a distinction between acute and circumflex accent is now made on long vowels. The difference can be predicted on the basis of phonological and morphological criteria, and this opposition can be treated as simply a surface realization of a single underlying pitch feature, for reasons we shall review in a moment. Second, accent in the finite verbal forms is now predictable, falling on the leftmost syllable permitted to bear accent by the general rules of the system. A number of non-verbal forms also show this recessive accent pattern.¹¹

Finally, and most significantly for our study, is the development of the so-called "three-syllable rule" in Greek. This rule limits the occurrence of accent to one of the final

¹¹A couple of extremely common verbs, namely eimi "I am" and phemi 'I say', are accentless in many of their finite forms, in direct parallel to the Vedic treatment of all such verbs.

three syllables of a word, with possible further restrictions on placement and type of accent based on the weight of the final syllable¹².

Three syllables is an uncomfortable number for metrical theories to deal with. Since the basic foot types are binary and unbounded, rules counting off by threes are considered, if not impossible, then at least highly marked. The solution in cases such as the Greek three-syllable rule, as in the somewhat parallel Latin case, is to suggest extrametricality as the source of the mysterious third element. Unlike Latin, however, Greek takes the weight of the final syllable of a word into account when assigning accent. Obviously, a direct copy of the Latin rules will not work.

Steriade (1988) has suggested an alternative application of extrametricality to account for the three-syllable rule. She begins by formalizing the rules to account for recessive accent, and then incorporates the features needed for phonemic accent into the existing framework. First, she posits that a word-final consonant in Greek is extrametrical. Then, as a separate rule, all light final syllables are

¹²Stating these restrictions in terms of weight rather than vowel length is controversial; see Steriade (1988) for discussion of the relevance of the syllabic coda to the application of accentual rules.

extrametrical¹³. Left-headed binary feet are then constructed from the right margin of the word. The word-tree (or word-level foot as she terms it) is right-dominant, and all secondary prominences are eliminated by an analogous operation to Halle and Vergnaud's tier conflation. If we examine some of the examples which Steriade presents (1988:277), we can see how these rules work in practice:

	<u>anthroopos</u>	<u>anthroopoo</u>	<u>lipothriks</u> ¹⁴
1.	anthroopo(s)	anthroopoo(n)	lipothrik(s)
2.	anthroo(po(s))	anthroopoo(n)	lipothrik(s)
	1 (* .)	(* *)	(* *)
	0 (* *)	(* (* *))	(*)(* *)
3.	anthroo	anthroopoo	lipothrik
	2 *	*	*
	1 (* .)	(* *)	(* *)
	0 (* *)	(* (* *))	(*)(* *)
4.	anthroo	anthroopoo	lipothrik

In step one, the last consonant in each word is marked as extrametrical, here indicated with parentheses. In step two, the final syllable is marked as extrametrical if it is

¹³Steriade makes the claim that final syllables ending in a consonant cluster are treated as heavy for the purposes of Greek accentuation. This falls out of her analysis, given that such syllables would still be closed even when a final consonant had become extrametrical. It has always been assumed, however, that weight in Greek, for the purposes of accentuation (certainly not for poetry) was based on a nucleus projection, not on a rime projection. I will not go into the possible counter-examples here, but the questionability of such a claim should be noted.

¹⁴To clarify some of the processes at work, I will adopt a slightly unusual transliteration system for Greek. Long vowels will be presented as double vowels (as in anthroopoo here) and all consonant clusters will be spelled out (ks rather than x).

now light; only anthroopo meets this condition. In step three, left-headed binary quantity-insensitive feet are built from right to left. The quantity insensitivity is not specifically mentioned here by Steriade, but must be stipulated to prevent problems with forms such as anthroopo, in which the prominence pattern with the metrical foot is directly opposite the weight relation between the two syllables.

In step four, the rightmost asterisk on level one is given level two prominence, marking it as the primary lexical accent. The final stage, not shown here, is to eliminate all other level one marks, thus erasing all potential secondary accents. This process yields the proper accentuation on such recessively-accented forms as /ánthroopos/, /anthróopoon/, and /lipóthriks/.

In order to handle nominal and adjectival forms which do not show recessive accent, Steriade introduces underlying morphemic accent, which consists of a preassigned level one mark. In other words, accented morphemes will automatically serve as the head of a metrical foot, and be in the running for bearing the final single lexical accent. Taking her examples again (p.278), the results of applying the same process to forms with accented morphemes is as follows:

	*	*	*
	ishkhuuros	ishkhuurotatos	ishkhuurotatoon
	*	*	*
1.	ishkhuuro(s)	ishkhuurotato(s)	ishkhuurotatoon(n)
	*	*	*
2.	ishkhuuro(s)	ishkhuurota(to(s))	ishkhuurotatoon(n)
3.	(* .) *	(* .)(* .)	(* .)>(* .) 1

	* * *	* * * *	* * * * *	0
	ishkhuuro	ishkhuurota	ishkhuurotatoo	
4.	(. . *)	(. . *)	(. . . *)	2
	(* .) *	(* .) (* .)	(* .) * (* .)	1
	* * *	* * * *	* * * * *	0
	ishkhuuro	ishkhuurota	ishkhuurotatoo	

Note that in the first form, extrametricality of the final syllable would normally apply at step two. The preaccented status of this syllable blocks this process by universal constraint (cf. the identical situation in Tokyo Japanese is section 6.2). The derivation of the first two forms is straightforward, given that the presence of a level two mark on ro forces foot construction to follow its lead. In the third form, the inclusion of the heavy final syllable allows for a binary metrical foot to be built after the preaccented syllable. In this case, it is the head of this final foot which bears the lexical accent, rather than the pre-accented morpheme. Thus, the "three-syllable" rule, which retracts accents positioned too far to the left in a word, falls out of this analysis automatically.

We can then add a final step onto Steriade's picture of Greek accentuation by stating the rules of tone association with the metrical structure. Short vowels will always simply bear a High tone, yielding the regular acute accent; there is no evidence in Greek for the secondary Falling tone following the accent as in the Vedic svarita. On long vowels, pre-accented vowels appear always to bear the acute, that is, the High tone is assigned to the second mora of the accent

vowel.¹⁵

In cases in which the lexical accent is assigned to a long vowel which is itself not underlyingly accented, the acute/circumflex alternation is predictable by the following rules:

- a) If the accent falls on the antepenult, only the acute is possible;
- b) If the accent falls on the penult, it is a circumflex if the ultima is light, and an acute if the ultima is heavy.
- c) If the accent falls on the ultima, it is circumflex.

How shall we account for these patterns in terms of the metrical model presented by Steriade? The crucial distinction here is the interaction found between morae and syllables in Greek. Accent is first assigned to a syllable; only then does a count of morae from the end of the word come into play. If possible, the High tone will associate to the third mora from the end; if this is not possible due to the syllabic accent assignment, it will associate with the closest mora possible to that position. In this feature, we see one of the most enlightening clues to the development of Greek accent, the inherent tension between a mora-counting and a syllable-counting pattern both at work in the same

¹⁵Steriade appears to assume that the acute on long vowels in Greek was phonetically a Rising contour as the circumflex was a Falling contour. This seems to me to be unfounded, since the ancient Greek grammarians do not mention such a Rise. It is more consistent with what we know about Greek tonology to assume that a High tone spread to the first mora of its vowel, producing a level long High-toned vowel, but a first mora High tone did not spread to the second mora, creating a Falling tone. This asymmetry between Falling and Rising contours is well known in the literature of pitch accent (but see Allen (1973) for a defense of the acute as a Rising tone).

prosodic system (again, a comparison with Japanese can be made; see 6.2).

Given this model of accentuation in Greek, can we suggest a evolutionary path from the reconstructed accentual system of Indo-European to the situation in Greek? Several suggestion on this development have been made. To take one example, Kurylowicz (1958) argues that the crucial change in Greek phonology was the identification of one long vowel with two short ones, as indicated in Greek metre. In his theory, this identification played in Greek roughly the same role as the apophony of syllabic resonants did in Vedic (and IE as a whole). When vowels had been so identified, it was possible to see vocalic length as the primary determiner of accent placement, and the older morphological system (inherent pitch accent) began to compete with a phonological system of prominence. If we make some comparisons of Greek accentual patterns with the suggestions made for Vedic, a number of innovations in Greek immediately become apparent.

First, it has long been recognized that the Greek cognates for many Vedic forms which either have default initial accent or no surface accent (vocatives and finite verbs) have recessive accent. Handling the default accent cases is simple, since both systems throw the accent as far to the left within a phonological word as possible. The three-syllable constraint leads to a large number of Greek forms having accent to the right of their Vedic counterparts, but the basic rule is unchanged.

The presence of recessive accent in Greek forms which correspond to Vedic cognates with no surface accent implies two major changes. First, such forms (at least the verbal types) have lost the unrealized underlying accents still present in Vedic. Greek has apparently levelled the categories [+Accent, -Tone] and [-Accent, -Tone] in favor of the latter. Second, it is no longer possible for the majority of such phonological words to surface without tonal assignment, i.e., the [-Tone] categories of Vedic have been merged with the [+Tone] categories. For Greek (except for the isolated verbal examples already mentioned), the opposition between tonic and atonic phonological words has been eliminated. Typologically, this can be seen as a shift away from a pitch-oriented system, which often allow words to surface without any markers of prominence, and towards a stress-like system, in which some surface prominence marking is obligatory.

This obligatoriness is taken a step farther in Greek when we examine the changes caused by the addition of enclitics to a word. As Goodwin (1879) summarizes, if the addition of an enclitic causes the regular accent of a word to stand outside of the domain of the three syllable rule, a second (acute) accent is added on the final syllable of the accented word, as long as this does not lead to a High tone on two adjacent morae of the word. If the addition of the second accent would create such a clash (only possible by the addition of a bisyllabic enclitic to a word with acute accent

on the penult), the final syllable of the enclitic is accented instead.

These accent-addition rules can be seen as evidence, along with the facts previously mentioned, that the domain of the three-syllable rule has become both a maximal range for lexical accent and an obligatory domain for accent, parallel to the role of the initial binary foot proposed for Vedic. One, and no more than one, accent must be present within the domain, so that if the addition of an enclitic pushes the original accent too far to the left, a default accent is placed to satisfy the conditions of a domain built over the new phonological string.¹⁶ To this degree, Vedic and Greek appear to have mirror-image minimal prosodic domains, once the effects of Greek extrametricality are taken into account.

These arguments for a final prosodic domain in Greek words provide evidence against the type of metrical model given by Steriade. While largely correct, her system of building iterative metrical feet, and then using a right-headed word foot to assign prominence to the last foot appears to have two problems. Like all systems invoking Tier Conflation, it overgenerates metrical structure, since it collapses together most of the distinctions made by foot construction. A second problem is that it does not allow for a clear-cut statement of the final domain under discussion.

¹⁶Note, however, that the regular rules of recessive accent do not apply again, as this would result in forms such as *ánthroopos tis rather than the actual ánthroopós tis.

I would suggest that a preferable solution would construct a single, non-iterative foot at the right margin of a word, following Steriade's rules as above. There is no need for further feet, and thus no need for a word-foot to assign prominence between them.

If this is correct, the Greek system has its traditionally recognized similarities to Latin accent (even more so, if the description of the pitch qualities of Latin accent given in the last chapter is accepted. In this case, the question of a similar evolution of the Greek metrical foot from an original non-accentual metrical grid naturally arises. The work of Allen (1968) has provided evidence for just such a structure.

In his examination of the correspondence between verse ictus and word-placement both in Homer and older tragic verse, Allen suggests a general rule of "strong" positions within Greek polysyllables, so that such strong positions are generally aligned with verse ictus. The formula which he generates, with some cosmetic changes to clarify the segments involved, is as follows:

[+strong] [+strong]

[(...) () ()]_{word}

In interpreting this formula, is a light syllable, a heavy syllable, and the parentheses have their normal meaning of optionality. In describing the match of such "strong" positions to the ictus, Allen (1987:134) says

What we have so far referred to as 'preponderant tendencies'

in fact turn out to approach complete regularity--that is to say, there are very few exceptions to a word of a particular quantitative pattern being placed in a particular relationship to the strong positions of the verse coda.

He goes on to summarize the relationship in very modern language:

If, then, we assume that a very strong preference for placing particular syllables of words in particular relationships to the strong positions indicates that the syllables in question possessed some kind of inherent phonetic 'prominence', we can deduce from the formula certain rules describing the incidence of such prominence in Greek words:

1. Prominence applies to an element constituted by either one heavy syllable or two light [ones].
2. Words...longer than an element have internal contrasts of prominence/non-prominence.
3. If the final syllable of a word is heavy, it is prominent.
4. If the final syllable is light, the next preceding element is prominent.
5. A preceding element separated from the prominent element is also (secondarily) prominent.

In a footnote, Allen explains 'separated' in point five: "i.e., by a heavy or by one or two light syllables, of which the first and last, though themselves elements, are not separated from the (primarily) prominent element." Allen then goes on to argue by analogy to Latin that the "prominence" predicted by his formula was probably phonetic stress; this argument, however, is subject to the same criticism made concerning the identification of stress and prominence when dealing with the Italic languages.

Translating Allen's formula and rules into the terminology used in this discussion, we might re-state them as follows:

- a) A final light syllable is extrametrical.
- b) Feet are built over morae, not syllables
- c) On level 1, build binary left-headed feet from the right

margin of a word.

- d) On level 2, build left-headed binary feet from the right margin over the heads of level one feet.

The only unusual parts of this rule when compared to other similar structures we have seen are the use of morae rather than syllables, and the building of a second layer of binary feet above the first. However, given the mora-based restrictions on accent we have seen, and Kurylowicz's ideas on the origin of Greek accentuation, a mora-sensitive rule is just what we should expect. The second feature assigns "strength" to every other foot in the word for the purposes of ictus-matching. While I have no real explanation for this patterning, it should be obvious that any poetic system which attempted ictus alignment with every foot on level one of this system would have little to recommend it. Despite these differences, the system presented here is so close to those we have suggested for Italic (and, as we will posit for Slavic) as to be striking.

The origin of the three-syllable restriction on Greek pitch accent can then be seen as a three-step process: first, the loss of iteration in the Greek metrical structure, resulting in a single foot built at the right margin of the word; second, the development of the pattern of extrametricality we have examined above; and finally, the development of the "in-foot/out of foot" distinction we have seen elsewhere. In Greek, the surviving metrical foot became the domain for the accentuation rule. In cases involving enclitics, a second metrical foot could (or, apparently, had

to) be built, creating a second accentual domain.

The relative flexibility of the Greek prominence pattern in comparison to the rigid stress rules of Arabic and Latin leads Allen to make an interesting observation (1987:138):

In Greek, unlike the other languages mentioned, we are dealing with redundant, non-accentual patterns, and syntagmatic variations in these would be no more peculiar than such variations in the melodic (international) patterns of words in a stress-accented language like English. [emphasis in original]

The variations at issue here involve the resyllabification of final consonants when the following word is vowel initial, which would change the proposed metrical structure just as it would alter the syllable's weight in terms of poetic considerations. Such changes are quite to be expected in any weight-based system. What is especially interesting about Allen's comment is that it recognizes the fossilizing effect on metrical structure which identification with the lexical accent appears to have. Both the Latin (Chapter Three) and the Slavic (section three of this chapter) examples show the influence of such a process. It is not too much to believe that the functions of accent, especially its culminative and delimitative uses, are at odds with a full metrical structure, and, when imposed upon it, tend to restrict its domain to smaller and smaller sub-sections of the word.

Thus, Greek can be added to the growing list of Indo-European and non-Indo-European languages in which a previously free, morphologically inherent pitch accent has either become completely dominated by metrical prominence (Latin, Polish, etc.) or has been limited in some ways in its

area of application by it (Russian, Greek, Serbo-Croatian). In our review of several Bantu languages in Chapter Six, more such parallels will become apparent.

One further question involving the prosodic history of Greek remains for us: the later loss of pitch accent and its replacement by simple stress. It is clear that such a change had occurred no later than the fourth century AD, and may have started one or two centuries earlier (Allen, *op. cit.*, p. 130). What is significant about this change for the model we have suggested here is that the stress accents replaced the pitch accents themselves, not the metrically strong positions suggested by the underlying foot structure. In this regard we have a direct parallel with the situation we will find in Russian. While such a change might seem counterintuitive at first, it is in fact fully in line with the point made in Chapter Two concerning the interchangeability of methods of marking accent. While the accents of Classical Greek were not based directly on the older metrical structure, they still were "prominent" in extremely important ways, clearly more prominent in the minds of the speakers than the rhythmic system which controlled them. Thus, the argument of Lupas (1972) against Allen's stress system on the grounds that the modern stresses are based on the old pitch accents, I believe, is not justified.

We may rightfully ask, however, what sort of metrical conditions existed on Greek accent, given that there was apparently no correlation between verse accent and the pitch

accents themselves. If Steriade's model is correct, it should mean that the pitch accents stand at the overall heads of the metrical structure, which should indicate some kind of rhythmic peak salient in weight-based verse. But this is a confusion on the role of the various metrical structures. We need not, with Allen, assume that he had identified a stress system in any degree; with no direct phonetic evidence to rely on, we are safe only to the extent of using the more abstract "prominence". As in the Oscan and Umbrian cases, there need be no identification with lexical accent whatsoever. Thus, the fact that we use metrical structures to assign pitch accent placement should not be confused with the overall metrical grid which does react with verse ictus; one structure clearly devolves from the other, but should not be identified with it in all cases.

In summary, the Greek system retains the basic distinguishing feature of the Indo-European accentual system, inherent pitch accent, in at least some morphemes. The interaction of this system with an originally unrelated metrical prominence grid has led to the restrictions on accentuation which we find in the Classical Period, as I argue has been the case in Latin. For further parallels, let us turn to the Slavic family.

4.3 The Jer-shift and Metrical Structure in Slavic

Any attempt at an adequate historical commentary on the development of the various prosodic systems found in the modern-day Slavic languages would be a matter of several

volumes. In this section, then, I will examine only one issue in which the application of metrical and autosegmental theories can assist in our understanding of historical change within certain branches of the Slavic family, the so-called jer shift.

By the time of the writing of documents in Old Church Slavonic (aka Old Bulgarian) in the period (950-1100), the era of Common Slavic (generally assumed to have broken up around 1000) was already ending (Leskien 1909). These writings give us an incredibly valuable view of the last stages of the period of commonality, and, together with facts established through the comparative method, we can determine a relatively clear picture of the assumed source language.

Within the reconstructed vowel system of Common Slavic, and still found in Old Church Slavonic, are two reduced (or "extrashort" vowels) called yers, usually written ь and ѣ. Unlike the use of these symbols in the modern Russian orthography, where they are markers indicating the palatal status of a preceding consonant, in OCS these were true vocalic segments. While the exact details of their pronunciation are unknown, it is clear from the patterns of palatalization on preceding consonants that ь was [-back] and ѣ was [+back]. This is clear from the palatalizing effect of the former, and the lack of palatalization before the latter.

Beginning around the thirteenth century in Russian, and at various other times for other Slavic languages, the yers

underwent a process by which they were either deleted or raised to the status of full vowels, depending on their position within a word. The rule governing their treatment in Russian is known as Havlik's Law:

1. Starting from the end of a word, word-final jers and jers in syllables not preceding a weak jer become weak.
2. Jers in syllables preceding weak jers become strong.
3. Strong jers are vocalized; weak jers are deleted.

When vocalized, ь and ѣ become /e/ and /o/ respectively.

This rule holds in general for the earliest stage of the "jer shift" in most of the Slavic languages. Thus, we have correspondences such as these (examples from Isachenko 1970):

OCS lŕstŕtsŕ 'flatterer' > Russian l'stets

OCS rŕpŕtsŕ 'murmur, grumble' > Old Russian rpot'

from the root svŕtsŕ- 'shoemaker', we find Old Russian

nominative *svŕtsŕ > svets'

accusative *svŕtsa > sevtsa

cf. Ukrainian svets'/sevts'a, Belorussian svets/sovtsa and Czech svets/sevtse.

Havlik's Law lends itself to a straightforward statement in metrical terms¹⁷. Iterating, left-headed, quantity-

¹⁷This metrical description contrasts with the approach taken by Kenstowicz and Rubach (1987), which deals with the jer shift in Slovak through the cyclical nature of lexical phonology. Instead of assuming a reapplication of rules as each morpheme is added to a word, I deal with the strengthening and deletion of the jers as a single process applied to the word as a whole. Both approaches yield the correct answer, but I believe that the historical parallels are clearer in a system such as I one I employ here. In general, I believe that cyclical application of rules is overused, and should be considered the exception rather than the rule in phonology.

sensitive binary feet are constructed from the right margin, with quantity sensitivity here relating to the full/reduced opposition. Degenerate feet are counted as weak metrical positions, not as strong as in the Italic cases. Using the examples above, our metrical model would assign foot status as follows:

1 (*)(* .)	(*)(* .)	(*)(* .)	(* .)(*)
0 * * *	* * *	* * *	* *
<u>l_ot_st_sk_e</u>	<u>r_op_tt_e</u>	<u>s_lv_ot_sk_e</u>	<u>s_lv_ot_sa</u>

Assuming that the labels "strong" and "weak" assigned by this structure are understood in the same way as the terms in Havlik's Law, jers dominated by a strong node will become full vowels and jers in weak positions will drop (note that nothing happens to inherently full vowels in either position). In the examples above, this yields the historically correct results. Examples with two complete metrical feet include

1 (* .)(* .)	(*)(* .)(*)
0 * * * *	* * * *
<u>l_oz_ot_sk_e</u> 'spoon' > <u>l_oz_ts_ek</u> <u>l_oz_ot_sk_eka</u> (acc.) > <u>l_zetska</u>	

Up to this point, the metrical model is simply a formalized restatement of the prose version of Havlik's Law, and does not directly contribute to our understanding of the process. However, an interesting change occurs in the form of the jer-shift rule in later Russian. The alteration between strong and weak jers is restricted to the final syllables of stems, with all jers to the left of the stem-final syllable being strengthened to full vowels (or perhaps we should say they undergo merger with the full vowels).

Thus, at this later stage we have such alternations as

d_ln_lk- 'day (dim.)' > denek (< d_ln_lk_l), den'ka; *dnek
kol_lts_lk- 'ring' > koletsko, koletsek (< kol_lts_lk_l); *kol'tsek
l_lz_lts_lk- 'spoon' > lozetska, lozetsek; *lzetska

In each case the starred form would be the expected result of the older version of Havlik's Law.

The most straightforward way to account for this change within the history of Russian is to posit a loss of iteration in the inherited Slavic foot-construction rule. Now, only a single binary metrical foot is built (though any number of degenerate feet may be built at the right margin), with the same quantity-sensitive condition as before.¹⁸

Examples:

1	(* .)	(* .)(*)	(* .)(*)	(* .)
0	***	***	***	***
	<u>d_ln_lk_l</u>	<u>d_ln_lka</u>	<u>kol_lts_lko</u>	<u>kol_lts_lk</u>
1	(* .)(*)		(* .)	
0	***		***	
	<u>l_lz_lts_lka</u>		<u>l_lz_lts_lk_l</u>	

Now, neither the default weak nodes previously assigned to initial syllables in forms such as d_ln_lk_l, nor the secondary full feet of the longer forms are constructed. Interestingly, especially in comparison with the situation found in Nootkan, the jers which are outside the metrical

¹⁸In these examples, as in the metrical grids built for Italic, there is no need for a word-level constituency, since the goal is not to find a hierarchy of prominence, but an alternating strong-weak pattern. I would claim that only accentual systems ever need to build structure above the foot level.

foot are strengthened rather than weakened. This result, however, is not as strange as it first sounds, since "strengthening" here involves a type of levelling or merger. Thus, outside of the single metrical foot, a possible alternation is lost, rather than any real prominence being gained.

The variations which still occur in the final syllables of stems, while historically regular, are open to synchronic reanalysis. The presence or absence of the final vowel now regularly corresponds to the presence or absence of a surface vocalic case suffix, since the jers of the older nominative singular and genitive plural endings have been lost.

An important point about the metrical structure needed to account for jer deletion is that it has nothing to do with stress assignment. Russian stress is based on the interaction of inherently accented and non-accented morphemes (Garde 1976) in a pattern very similar to (and directly related to) that of Vedic. Thus, the structure built for the "jer-shift" rule would appear to be the single metrical system at this stage of the language.

The metrical structure does appear to play a role in at least one other phonological process in Slavic, however. As Timberlake (1983) has pointed out, various languages had different ways of handling the changes required when an accented jer was deleted. In general, the accent shifted one syllable to the left, unless the jer had been in an initial syllable, in which case it shifted to the right. In addition,

a number of languages lengthen the newly-accented vowel. Within a metrical model, we can see the leftward shift of accent as a shift of prominence from the weak node of a metrical foot to the strong one (cf. the parallel tone-shifts of Haya in section 6.3). Of course, initial syllables must shift accent to the right by default. The lengthening process can be seen as the collapse of a single quantity sensitive foot from two syllables to one, thus triggering quantitative prominence on the surviving syllable.

This picture of the jer-deletion rule immediately suggests interesting parallels with at least two of the systems in our discussion. The loss of iteration within the history of the Russian rule is a mirror-image of the Nootkan situation given in Chapter Five, or perhaps a more direct match if we ignore the position of the remaining foot and instead simply state that the "first" foot is retained.

The second parallel is clearly the syncope rule of Oscan and Umbrian, which is a precise match (with long/short in place of full/reduced) to the rule developed here. Unlike the Wakashan example, however, such similarity between Italic and Slavic raise the question of an Indo-European inheritance. While the degree of displacement both geographically and temporally between the two systems, makes a direct tie between the systems suspect, the cumulative evidence for a similar metrical grid in Greek, Italic, Slavic, and (as we will see) Celtic may point to a common IE prominence patterning.

If then we assume that Common Slavic had a split prosodic system similar to that postulated for Latin, with the inherited pitch accent co-existing with a non-accentual metrical structure, we have the perfect situation, under the present theory, for a variety of reorganizations of the prosodic features present. In fact, the modern languages of the Slavic group display an extraordinarily wide variety of prosodic systems; only a true tone language is missing. While any real account of the various paths taken by these languages is beyond the scope of this section, a survey of the prosodic landscape is in order.

All of the languages of the East Slavic group (Russian, Ukrainian, Belorussian) have phonemic stress, and along with the Baltic languages maintain to some degree the Indo-European accentual system. The major change here (aside from a good number of accentual shifts; see Collinge (1987) for a listing) is a cosmetic one: the exchange of pitch accent for intensive stress. In Russian, there remains a trace of the older system in the pattern of vowel reduction.

Unstressed vowels in Russian generally undergo relatively marked reduction. The vowel of the immediately pretonic syllable is somewhat resistant to reduction, though clearly not to the degree of the stressed vowel itself. In our terms, the pretonic vowel has "negative prominence", since it fails to undergo a reduction rule. This immediately strikes one as an unusual pattern for a true intensive stress system (and the Russian stress is even more intensive than

its English counterpart). In general, we would expect the vowels nearer the stressed syllable to undergo the greatest degree of reduction, or for reduction to apply in a linear pattern throughout the word.

Yet such a prominence effect on a pretonic syllable is not at all unexpected in a pitch-based system. In this case, spread rather than alternation would be the rule. In Vedic, for example, we saw such a rule spread High tone to an adjacent syllable. This "prominence spread" is an example of a feature identified with an earlier typological system surviving even when that system itself has been lost.

West Slavic languages also employ a stress accent, but it is in all cases predicable. In Polish, for example, main stress falls in general on the penultimate syllable. The few exceptions most often involve foreign loanwords or some cases in which vowel contraction has changed the syllable count. A number of researchers (e.g. Lehr-Splawinski (1923)) have indicated that there is a fairly regular secondary stress on the initial syllable, though this is not universally recognized. If it does exist, at least in some Polish dialects, it presents an interesting contrast with the situation in Czech.

The standard dialect of Czech has regular initial accent, with secondary accent on the penult. It thus appears as the mirror image of the system in Polish. Both Upper and Lower Sorbian, two smaller languages spoken within the border of modern Poland, appear to show this same pattern, though

the information on the secondary penultimate accent is also spotty.

In these cases, we see the same kind of marginalization of metrical structure found in Italic, Greek, the jer-shift in Slavic itself, etc. In West Slavic it appears that a binary metrical foot is built at both ends of the phonological word, though Czech and Polish have assigned primary and secondary prominence at the word level in opposite directions.

In South Slavic we find both the greatest variety of prosodic systems and the single system with the most accentual dialects. Serbo-Croatian makes use of pitch accent with limited distribution; on the surface, a High tone will always occur on one of the first two syllables of a word (but see below on the actual placement of accents). Slovenian has free stress, with vowel length, opposition between the open and closed variants of /e/ and /o/, and optional (or dialectal) High vs. Low tone all being distinctive only in stressed syllables. Long stressed vowels in Slovenian may have either a rising or falling tonal pattern, while short vowels do not have distinctive tone. Thus, the following patterns are found:

short l^év 'lion' (no tonal distinctions)

long k^onski 'horse (Gen.sg.)' (rising tone, close /o/)

v^oda 'water' (rising tone, open /o/)

v^odo 'water (Acc. sg.)' (falling tone, close /o/)

Macedonian has a relatively regular antepenultimate accent, though a number of exceptions have arisen to disrupt the general pattern. Finally, Bulgarian has disinctive stress, more on the East Slavic model.

Serbo-Croatian is the most studied of the pitch accent systems, and deserves a fuller outline here.¹⁹ Only two tonal features, High and Low, are needed to describe the accents of Serbo-Croatian, though the rules for the precise locations of the features can become quite complicated. In general, the dialects agree on taking vowel length into account when determining the possible accentuation of a given syllable. A long vowel may bear either a High, Low, or Falling pitch; a short vowel can be either High or Low. The possible pattern in the Stokavian dialect (the basis for the literary language) is as follows:

H L	/gla:vu/	'head (Acc.sg.)'
H H	/gla:va/	'head (Nom.sg.)'
L H	/pretvarati/	'to transform'
L L		not allowed

Following an autosegmental description of Serbo-Croatian such as that presented by Inkelas and Zec (1989), we can distinguish the H L and H H patterns by assuming that the former has a High tone associated with the vowel of the first

¹⁹A very small number of the Torlak dialects of Serbian have been described as having fixed stress rather than pitch accent; these dialects are located at the extreme southern end of the Serbian dialect zone, adjacent to several dialects of Macedonian.

syllable, while the latter has the High tone associated with the vowel of the second syllable. The tone of the second syllable then spreads one syllable leftwards by a regular rule:

$$g \overset{H}{l} a v u \qquad g l a v \overset{H}{a} > g l a v \overset{H}{a}$$

A form like /pretvarati/ would then be assigned accent (i.e. High tone) on the third syllable, with spread onto the second. In this case, the actual place of "accent" is outside the first two syllables, while the surface High tone still begins within the two syllable limit. The rule of leftward spread here is the synchronic form of a change in Serbo-Croatian accent known as the Neo-Stokavian retraction, which occurred in most, but not all, dialects around the fifteenth century.

Serbo-Croatian can then be analyzed as an "intermediate" system, in which pitch differentiation has been maintained, but the placement of accent has become limited by metrical constraints. Two important features can be mentioned here. First, the first two syllables, which in most dialects must contain a High-toned (i.e., accented) element, appear to enjoy a special prominence, similar to the status of the same syllables in Nootka (see Chapter Five). It would appear that Serbo-Croatian has reanalyzed the regular prominence of the initial syllable in the same way that Czech and Slovak have, as the establishment of a metrical foot in initial position. While Czech interprets the resulting prominence in terms of stress, SC uses the foot itself as a domain in which a High

tone must appear. So, once again, we have a metrical foot acting as an obligatory accentual domain, parallel to Greek and Vedic. Second, the retraction of High tones in some words points to a spreading rule entirely consistent with other effects of the metrical structure, such as the accentual shifts involving jers. This process of attraction to metrically strong positions is crucial when looking at Serbo-Croatian.²⁰ The Neo-Stokavian retraction makes sense within this framework as a generalization of such foot-based rules.

Thus, the variety of systems found in the modern Slavic languages would appear to be derivable from the interactions of the prosodic subsystems involved, as discussed in Chapter Two. As we move out of the Indo-European family to examine Wakashan, we shall find a number of striking prosodic parallels in what is clearly a very different kind of language family.

²⁰Compare also the situation in Haya discussed in Chapter Six, in which similar shifts of tonal features occurs.

Chapter Five: Prosodic Change in the Wakashan Languages

This chapter presents the results of research into certain aspects of the prosodic systems of the major languages of the Wakashan group, spoken along the coasts of the Pacific Northwest. As I have noted earlier (Wilson 1987, 1988), this particular family is an especially rich source of both common and fairly unusual prosodic changes, and the examination of these facts will force a broadening and reanalysis of some aspects of the framework we have developed so far. At the same time, many of the mechanisms which we have invoked in our discussion of Italic and other Indo-European languages also appear to be relevant for Wakashan, thus lending support for the claims of the current study.

Section 1 of this chapter reviews the relevant background information on the Wakashan languages, and gives details on our sources of information on the family as a whole. Because of the unfamiliarity posed by Wakashan to many readers, and the complexity of some of the morphological and phonological processes found in Wakashan, this discussion will be somewhat more detailed than in any of the other chapters. Section 2 compares the prosodic systems of the two major sub-groups of Wakashan, and attempts to explain some of the posited historical developments through the use of a metrical model. Finally, Section 3 looks at a relatively rare prosodic change found in Heiltsuq, one of the major Wakashan languages: the change from a stress system to a pitch-accent system.

5.1 The Wakashan Languages

The members of the Wakashan family of languages are spoken by a variety of Native American tribes on Vancouver Island, along the southern shores of British Columbia, and on the Olympic peninsula in Washington State. It has long been recognized that the family divides into two main subgroups, identifiable on phonological, syntactic, and lexical grounds (Boas 1911). The southern branch, called Nootkan, is made up of Nootka (with a number of recognized dialects, especially Tsishath and Kyuquot); Nitinat, and Makah. The northern, or Kwakiutlan, branch includes Kwakw'ala (previously called Kwakiutl), Heiltsuq (or Bella Bella), ?O?owekyala and Haisla¹. While the two main subgroups within Wakashan are relatively distant from each other (Sapir at one point compares them to Latin and Slavic (1911:15), later to Russian and German (1938:254)), the languages within each subgroup are phonologically fairly close. Lincoln and Rath (1986:2) report a "high degree of mutual intelligibility between Haisla, Heiltsuq, and ?O?owekyala; Nootka recognizes the subgroupings by having different words for those speaking Nootkan and those speaking

¹The English transcriptions of a number of these names are variable, Kwakwala, Nitinaht, and Heiltsuk being among the most common variants.

Kwakiutlan.²

Like many language families in the Pacific Northwest, Wakashan has a consonant-rich phonemic inventory. Especially notable are the glottalized series of sounds, which include such relatively rare phonemes as /l'/, /l'/. /w'/, /y'/, /m'/, and /n'/. Vowels can be phonemically long or short in the Nootkan languages, and full or reduced in the Kwakiutlan group³. Syllables in all Wakashan languages have the general underlying form CV(R)C₀-⁴, where (R) may be a resonant, the second element of a diphthong (only in the Kwakiutlan group), the second mora of a long vowel, or, interestingly, a glottal stop.

Swadesh (1953) has suggested the following as a reconstruction of the Common Wakashan phonemic inventory:

²There have been various attempts to associate Wakashan with other linguistic families, including Algonquian (Sapir 1929) and both Salish and Chimakuan (into the proposed "Mosan" family, Swadesh (1953)). The problems of establishing genetic relationships within the Pacific Northwest Sprachbund are, of course, formidable, and I will not take sides on these issues in the current study.

³ The phonological status of schwa in Kw'akw'ala is disputed, see Boas (1947) and Lincoln & Rath (1980) for the arguments for and against assuming a schwa phoneme, respectively. In this paper, I will take Boas' view, that schwa and its various allophones are phonemic, as the correct one. It is certainly correct for older stages of Common Wakashan as I would reconstruct them.

⁴ In Heiltsuq, the deletion of reduced vowels in initial syllables can create forms with two initial consonants. This is the only occurrence of initial clusters in Wakashan, and even in Heiltsuq it cannot be underlying. Words and syllables may not be vowel-initial, and such words borrowed into Wakashan are pronounced with an initial glottal stop.

b	d	z	λ	g	g ^w	G	G ^w	?
p	t	c	χ	k	k ^w	q	q ^w	
p'	t'	c'	χ'	k'	k ^w '	q'	q ^w '	
		s	ʃ	x	x ^w	x̣	x̣ ^w	h
m	n	ɣ	l	y	w			
m'	n'	ɣ'	l'	y'	w'			

i, a, u,

Here /λ/ is a voiced lateral affricate and /χ/ its voiceless counterpart. /z/ is a voiced alveolar affricate.

The Kwakiutlan languages have maintained this inventory with very few changes. /ɣ/ and /ɣ'/ have merged with /ŋ/ and /ŋ'/ respectively, and schwa occurs with a number of predictable allophones, primarily [ɪ] and [ʊ]. In the course of our discussion on the history of accent, I will refer to this general phonological conservatism of the Kwakiutlan branch of the family at several points.

The Nootkan languages, on the other hand, have undergone significant changes in their phonological inventories from this reconstructed pattern. The most striking development has been the merger in all three languages of the voiced obstruents with the voiceless series. Examples (Haas 1968):

Heiltsuq	<u>G^wa:lis</u> , <u>G^w y'alis</u>	'autumn'
Makah	<u>q^wa:ye:ʔicx</u>	'id.'
Nootka	<u>ʔay'i:ch</u>	'id.'

(/ʔ/, a pharyngealized glottal stop, is the regular Nootka and Nitinat reflex of Common Nootkan /q'/ and /q^w'/, indicating an initial glottalization no longer seen in the

Heiltsuq and Makah forms).

Kwakw'ala, Heiltsuq	<u>zəw'in</u>	'sockeye salmon'
Nootka	<u>cuw'it</u>	'id.'
Nitinat, Makah	<u>cu:wit</u>	'id.'

The last example from Nitinat and Makah illustrates an important change shared by those two languages: the loss of some or all glottalized sonorants. Makah has lost all such segments, while Nitinat has merged /w'/ and /y'/ with their plain counterparts. When such segments stood in initial position, the glottalization was simply lost; in intermediate and final position, the loss of glottalization is accompanied by the lengthening of the preceding vowel. This can be seen in the example above, and in such forms as

Nootka ʔuy'i 'medicine', Nit. ʔu:yi 'id.', Makah q'u:y 'id.'

Nootka c'an'i 'unable to see', Nit. c'a:di 'id.'

Nootka lim'aqsti- 'spinal cord', Nit. li:baqsti? 'kind'⁵

We will have more to say about the nature of this process later in the chapter.

The second change, common to Nitinat and Makah, is the denasalization /m/ and /n/, which re-introduced /b/ and /d/ into the phonological inventories of the two languages. We can see such a process in several of the examples above; also compare Nootka m'a:m'iqsu 'older sibling' with Nitinat

⁵Haas (1968) explains this correspondence by pointing out that the spinal cord is considered to be the seat of emotions by the Nootka, and goes on to translate "heart (fig., not the physical organ), mind, will, power." The Nitinat term would then be parallel to "kindhearted".

ba:biqs⁶ 'id.', Nootka n'ac- 'to look' with Nitinat dac- 'id.' and Nootka -a(:)n'ul 'along, all along', Nitinat -a(:)di, 'id.' Length marked in parentheses is so-called "variable length", discussed below.

All Wakashan languages are markedly polysynthetic, with a large number of morphophonological processes occurring both at morpheme boundaries and at a distance. These processes include a number of vocalic alternations, including deletion, contraction, shortening, and lengthening; reduplication of at least four distinct patterns; "hardening", a glottalizing process; "softening", a variety of consonant lenition with synchronically unusual results (e.g. /l/ to /y/); and a number of accentual changes that will be discussed below.

All words consist of a root and a series of suffixes, with some morphologically predictable infixation also occurring as part of reduplication, and some infixes related to certain types of generally derogatory or imitative forms which Sapir terms "abnormal speech" (Sapir 1915). There are no prefixes, though Haas (1972) presents evidence that there may have been at a very early stage of Common Wakashan (and see the discussion of "empty stems" below).

To give an example of Wakashan word construction and morphophonology, the following Nootka forms are given with a morphological analysis (Swadesh 1939):

⁶The apocope of the final vowel should also be noted, being relevant to the rules of vowel deletion presented later.

wik?ay'aqəsiʔayo?atʔ 'see someone act foolishly'

Root: wik- 'no, not...'

Suffixes:

-ʔatʔ 'aware of...'

-aq 'inside' (this suffixes "hardens" the preceding /tʔ/ to /y'/)

-siʔa 'act, do...'

-yo?atʔ 'see...'

?o:?otahšimčy'ak 'device for ritual training for success in hunting or whaling'

Root: ?o- 'it, such and such (a so-called "empty stem")'

Suffixes:

-atah 'hunting, catching...' (causes reduplication of the stem)

-šimč 'ritual traing for success in...' (causes lengthening of the first vowel)

-y'ak 'instrument, device for...'

Processes: ?o-atah-šimč-y'ak > ?o-?o-atah-šimč-y'ak (by reduplication) > ?o-?otah-šimč-y'ak (by vowel contraction, see below) > ?o:?otahšimčy'ak (by vowel lengthening)

?a:ʔa:ʔqimʔa 'handling two round objects at a time'

Root: ?a - 'two'

Suffixes:

-qimʔ '...many round objects', -a durative aspect

Processes: stem lengthening and initial CVC-reduplication to express repetitive aspect.

Stems in the Wakashan languages are generally of the shape CV(C)- (some bisyllabic stems are also found), with a number of related stems being distinguished only by their second consonants, yet not in any pattern regular enough to allow further divisions of the roots (the relationship is similar to English phonestemes). The processes which affect segments at a distance usually target the initial syllable of a complete form, either before or after reduplication.

The suffixes themselves divide in all of the languages into two morphological classes, termed stem-suffixes and

word-suffixes by Boas (1947), or formative and incremental respectively by Sapir and Swadesh (1939). Stem-suffixes are attached directly to stems or to other stem-suffixes, while word-suffixes may only be attached to otherwise complete phonological words. Swadesh (1939) lists a number of differences between the phonological effects caused by the addition of each type of suffix, both on adjacent and non-adjacent segments. These differences may imply the existence of a strong phonological boundary between word-suffixes and the preceding morphemes, and the relevance of such distinctions is discussed further below.

5.1.1 Sources for Wakashan

Our bibliography of the Wakashan languages contains a wide range of sources, varying greatly both in quality and orientation. Some languages, such as Nootka proper, have been studied little in the last few decades; here the work of Edward Sapir and Morris Swadesh, both separately and together, remains the primary source of information (Sapir (1924), Sapir and Swadesh (1939), Swadesh (1939)), though the field work of Suzanne Rose (1982) has been invaluable in describing a modern dialect of Nootka. Analyses of various aspects of Nootka and Nitinat have been done by Haas (1968, 1972). For Kwakw'ala, Boas (1947) remains the main grammar; he also did a great deal of work on an extremely useful but unpublished etymological dictionary. Lincoln and Rath (1980, 1986) and Rath (1981) are the main published sources on Haisla and Heiltsuq. Jacobsen (1979) is the best discussion

of the family as a whole.

One problem encountered when discussing the prosodic systems of the Wakashan family is the different priorities of the researchers involved. Boas and his followers in work on the Kwakiutlan languages have generally taken a more phonetically-oriented approach in their work, and accentual issues are both discussed and carefully marked in the texts for these languages. For Nootkan, the situation is just the opposite. Following Sapir's lead, most workers on these languages (especially Swadesh and Haas) have employed a phonemic transcription, which has left stress largely unmarked.⁷ It has thus been necessary for me to work from the earliest of Sapir's writings (especially "The Rival Whalers (1924)" and "Abnormal Types of Speech in Nootka" (1915)), as well as directly from copies of his field notes, which were kept in a phonetic transcription. Still, it should be made clear that the sheer quantity of prosodic information available on the Nootkan languages cannot compare to that found for Kwakiutlan, and the theoretical statements made about the two subgroups should be viewed with that in mind.⁸

⁷Sapir (1924) mentions several times that "stress in Nootka is predictable", but nowhere gives the rule of stress assignment.

⁸I am indebted to William Jacobsen (p.c.) for almost all the data on stress in Makah that I have. I have no direct information on stress in Nitinat, though the phonological processes in that language which parallel rules in Nootka and Makah imply a similar system.

5.2 The Prosodic Systems of Wakashan

Within the Wakashan family it is possible to find a surprisingly wide range of prosodic systems. All of the languages of the Nootkan subgroup show a predictable stress accent, though the exact details vary. Kwakw'ala also has predictable stress, but along a different set of rules from any of the Nootkan languages. Heiltsuq has an unpredictable pitch accent system, while Haisla appears to have a dialect split between pitch accent and stress. Each of these systems will be described in some detail to make the issues raised by internal comparison clear.

5.2.1 Kwakw'ala

Kwakw'ala has the simplest and, I would argue, the most conservative stress system of all of the Wakashan languages. As with all of the languages of this group, syllable weight is an important determiner of stress placement. In the Kwakiutlan subgroup, the languages distinguish full and reduced vowels.⁹ A light syllable contains a reduced vowel, while a heavy syllable contains either a full vowel, or a reduced vowel followed by a tautosyllabic non-glottalized

⁹ Boas (1947:207) describes this distinction as between "long and very short", but the vowels he terms "very short" are the same set (schwa and its phonetic variants) which he later calls "a weakened vowel". His distinction between schwa and short /a/ at this point appears to be unfounded. Boas' use of the macron to distinguish "longest vowels" is, as he points out, predictable from the placement of accent and the glottalic qualities of the surrounding consonants.

resonant (e.g., the first syllable in s mtos)¹⁰. The number of consonants following the vowel or vowel + resonant does not affect syllabic weight; thus, weight is determined by the nucleus and not the rime. Boas describes this pattern (in terms of the shapes of roots, which he takes to be the primary determiner of stress) by saying (1947:212)

Many stems are of the type cvm, cvn, cvl in which the short vowel is always phonemically to be identified with [schwa]. The vm, vn, vl function in these cases in many respects like long vowels [i.e. full vowels].

How can we best represent this definition of heavy and light syllables? As illustrated in the Passamaquoddy example in the previous chapter, reduced vowels have in some examples been handled within theories of autosegmental phonology by not assigning them a vocalic slot on the timing-element tier. This makes such vowels "invisible" to a range of phonological processes and eligible for deletion. It would appear that such a solution would not be appropriate for the facts of Kwakw'ala, however. In general, reduced vowels are not "weak" in Kwakw'ala: there is not regular deletion process, they are not invisible to stress assignment, etc. This puts

¹⁰Lincoln and Rath (1980) treat such schwa + sonorant sequences as the phonetic realization of a single syllabic sonorant, and would thus transcribe a word such as k'ln'ala 'sound of wheels turning' as /k'ln'ala/; Boas implies the same identification at one point (1947:208). Such a transcription, however, makes it impossible to clearly state the difference between heavy and light syllables in any non-arbitrary way. While this reduction of schwa + sonorant to a single syllabic is, I believe, correct on a purely phonemic level, the stress rule of Kwakw'ala appears to apply at a stage in the derivation in which such elements count as branching nuclei).

them in a clearly different category of the epenthetic vowels we shall discuss below, which do behave as if they are "floating" vowels in the autosegmental sense.

Instead, I suggest that what are clearly phonetically reduced vowels in Kwakw'ala behave underlyingly much like "normal" short vowels, i.e., they are assigned one timing slot on the CV tier. Full vowels are assigned two slots, as if they were underlyingly long. The sequence reduced vowel + sonorant would then be treated as a full vowel automatically, since it would fill both timing slots of a long nucleus:

Light syllable, non-branching nucleus:



Heavy syllable, branching nucleus:



Epenthetic schwa, no timing element associated:

Notice that we must stipulate that sonorants only lengthen a nucleus when they are non-glottalic. In fact, the effects of glottalization go further than this. An otherwise full vowel followed by a tautosyllabic glottal stop or glottalized resonant is treated as reduced. This appears to be the case for the purposes of stress assignment even when the texts do not show the vowel as schwa. So, Boas (1947:218) gives such examples (his accentual case seven) as:

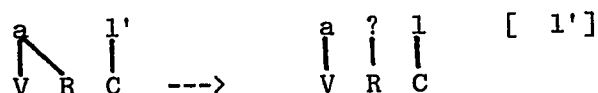
de?stód 'to wipe the eyes' a?xstód 'to open a door'

kʷa?xʷé? 'to sit in the rear' kʷaxʷó 'sit in a tree'

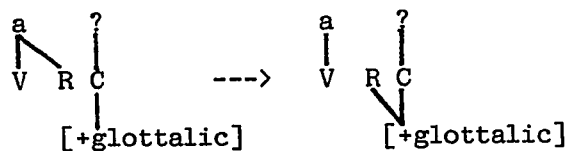
Since the basic rules of accentuation in Kwakw'ala assign stress to the first heavy syllable in a word, the absence of first-syllable stress in these forms can only be

explained by the presence of the glottal stop in the syllabic nucleus.

Such examples would at first appear to present a problem for the autosegmental model just presented, since if the glottal stop were actually occupying the resonant slot on the timing tier, we would expect the co-nuclear vowel obligatorily to surface as schwa. Thus, a depiction of the shortening process involved here as



is clearly incorrect (though it may be correct for the parallel process in Nootkan). Instead, it will be necessary to assume that a full vowel may occupy both nuclear timing slots, while at the same time the glottalic features of the following glottalized sonorant or glottal stop are associated with the nuclear resonant slot. The result would be a description such as



in which [+glottalic] is the only feature to spread from the sonorant to the R-slot of the timing framework. This spread apparently blocks the second mora of the nucleus (the R-slot) from counting in the calculation of syllable weight.

In cases with a sonorant in stem-final position, we find a further development: the vowel in the stem is always reduced if the stem is followed by a consonant-initial

suffix. Thus we have such examples as (Boas 1947: 219)

w'ana 'to change', but w'ənx?id 'begin to change'

ɬala 'to scoop up', ɬəlx?id 'begin to scoop up'

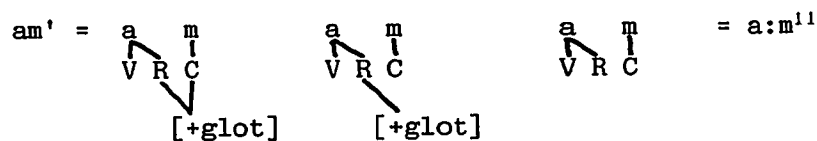
zam'a 'to suck', zəm'x?id 'begin to suck'

nan 'grizzly bear (ceremonial name), nəŋGəml 'grizzly bear mask'

Thus, when the sonorant of the root is able to resyllabify, the vowel surfaces as full, but when a following consonant creates a tautosyllabic sonorant in the first syllable, the vowel is reduced, apparently to prevent a superheavy nucleus. In these cases, we must assume that the sonorant itself is associated with the resonant slot in the nucleus (along with the feature [+glottalic], if present). To account for the alternation in these cases, we must assume that the stems involved have the underlying shape CVR-, in which the sonorant must occupy either the R-slot of the nucleus if it remains tautosyllabic with the vowel. When followed by a vowel-initial suffix, however, the sonorant resyllabifies as the onset of the next syllable, allowing the vowel to assume its full form. When followed by a consonant-initial suffix, the sonorant occupies the R-slot of the nucleus and the vowel is reduced.

This pattern is the basis for the claim of phonemic status for schwa in Kwakw'ala, as it will be necessary to distinguish roots of the form CVR- which always show a reduced vowel from those which have the type of alternation seen in the examples just given.

Further evidence for this analysis comes from the Nitinat process of de-glottalization discussed above. Recall that glottalic sonorants in medial or final position lose their glottalization, with lengthening of the preceding vowel. The effect of lengthening these vowels can best be seen in light of a similar process in Makah, which has also lost some glottalized sonorants. Here, however, the glottalization is only lost completely when the sonorant is in word-initial position; elsewhere the result is the sequence ? + sonorant. In autosegmental terms, such a change can be seen as the introduction of a C-slot and the re-association of the features onto the new timing elements. The process in Nitinat could have taken the same route, but the subsequent loss of the glottal stops in these cases would have allowed the lengthening of the preceding vowel:



One final piece of evidence to back up this model of syllable weight and glottal features in Wakashan comes from cases of metathesis between Kwakw'ala and Heiltsuq. In the roots for the number 'one' in each language, we find Kwakw'ala n'ə m- but Heiltsuq m'ən-. While the segmental features of the two consonants have metathesized, the

¹¹Recall that in the Nootkan languages, the crucial vowel-length distinction is short vs. long rather than full vs. reduced. Nitinat short vowels are thus associated to single nuclear slots, and long vowels to two.

glottalization has remained on the onset. Since, in these languages, one cannot separate /n'/ or /m'/ into consonant sequences (especially in initial position, where only a single consonant is allowed), the easiest way to explain such a "split metathesis" is by placing the feature [+glottalic] on a separate plane, allowing it to remain associated with the onset timing slot while all other features are switched.

After this laborious discussion of syllable weight, the basic stress rule of Kwakw'ala is quite simple: Main stress falls on the first heavy syllable of a word, with secondary stresses falling on alternating syllables after the main stress if they are heavy. If a syllable that would normally receive a secondary stress is light, it does not surface with any degree of stress.¹² The regular count of syllables is maintained, however, so that other secondary stresses keep their regular placement (in contrast with the Passamaquoddy example). This can be contrasted with the treatment of schwas which are added by a set of epenthesis rules. In these cases, the schwa is apparently inserted after the stress rule applies, since they are not counted in the assignment of secondary stresses. Examples of stress placement are

p'ádək'ém?idá

wəʔásol'á?e

góxwbidó

góxwbidəwé

¹²The exception is a word containing all light syllables; in this case, stress falls on the last syllable of the word.

Notice in the first form that the sequence /m?/ is treated differently than the segment /m'/, which would be syllabified as the onset of the fourth syllable, leaving the third syllable light. In the form wəʔásol'á?e, the glottal stop again is simply the onset of the fifth syllable and does not shorten the vowel /a/. The last two forms are from the same root. In the second case, the addition of -e causes the preceding /o/ to "fracture", producing /əw/. In these cases, the schwa is epenthetic, and is skipped when assigning stress.

At this point it is important to note two features of the Kwakw'ala stress system that will become significant when we compare it to the situation in Nootka. First, primary stress in Kwakw'ala may fall on any syllable of a word, as long as all preceding syllables are light: sált'ède, Gə?áalaxs, m'əkwála, and so on. Second, the secondary stress system appears to be regular and quite distinct.¹³

When formalizing Kwakw'ala stress in metrical terms, we find a marked advantage to the grid model over the branching tree model. Under both systems, stress is assigned through the building of iterating binary feet, left-headed, from the left margin of the word. The difference between the two

¹³Boas in fact marks secondary stresses only occasionally in his Kwakiutl Grammar, but his accentual rule eleven clearly shows that he considered secondary stresses to operate on regular rules, and he marks such stresses with greater frequency in his Kwakiutl Tales. Lincoln and Rath (1980) neglect such marking, but this is not surprising given their highly phonemicized and abstract depiction of Kwakw'ala.

models arises from the treatment of light syllables to the left of the first heavy syllable. The tree model must account for the absence of stress on any of these syllables in one of two ways. First, a special condition might apply to the first foot of the word, stipulating that the strong node must dominate a heavy syllable. The obvious problem is that such a stipulation is arbitrary, and unnecessarily separates the first foot from the remaining feet.

The second approach would invoke extrametricality on the left margin of the word, stating that an unbroken string of light syllables are all extrametrical. While this solution would be possible under some of the looser views of extrametricality, it would be rejected by the majority who hold that only a single phonological constituent may be extrametrical.

The grid formalism of Halle and Vergnaud (1987) is faced with no such unattractive choices, however. The parameters of stress assignment would be stated as¹⁴

- a) All nuclei receive a line 0 asterisk.
- b) All branching nuclei receive a line 1 asterisk.
- c) Build iterating binary feet on level 1, left-headed, left to right.
- d) Find the heads of level 1 feet on level 2, left.
- e) Continue (d) on each level.
- f) Word-level constituent is right-headed.

The last step, parameter (f), would only come into operation in cases where there are no heavy syllables in a

¹⁴I am simplifying the details of the process of setting parameters to make the presentation more direct.

accentual system, however, it is considerably closer to Kwakw'ala than to either Heiltsuq or Haisla. As described by Lincoln and Rath (1980:12-13), Owekyala stress falls on the first full vowel in a word, with the same condition concerning glottalized resonants found in the other languages¹⁵:

wáta 'to pull'

ʔúy'a 'to decorate'

dən'əm 'buoy line'

cəy'á 'to get water'

q'əm'səlǐ 'unripe berry or fruit'

Lincoln and Rath do not make any statements of secondary stress patterns for ?O?owekyala, and I have not been able to locate any other records of ?O?owekyala speech in order to make a decision on the presence or absence of secondary stress in that dialect. It would be surprising, however, if a system so closely related to Kwakw'ala would show such a difference.

Because of the major prosodic changes which have occurred in Haisla and Heiltsuq, I will delay discussing their prosodic systems until section 4.3, and instead go on

¹⁵Because of major differences in the assumption made concerning the underlying transcription of Wakashan in Lincoln and Rath's work and the present study, I have found it necessary to translate most of their descriptions of accentual rules to a certain extent. The actual statement of ?O?owekyala stress cited here is, "the first vocalic plain resonant of the word automatically bears stress when it is not followed by another vocalic plain resonant." In their approach, all syllabic segments are considered resonants (with /a/ as the only true vowel), and the statement concerning a following plain resonant translates to the "resyllabification" condition we have discussed earlier.

to the Nootkan side of the family, in which a clearer parallel to the Kwakw'ala/Owekyala stress system can be found.

5.2.3 Nootka

The Nootka stress system, like those already described, is based on a distinction of syllabic weight, but the definition of weight is made on a different criterion. Since neither Nootka itself, nor either of the other main languages of this subgroup has reduced vowels, the long/short vowel distinction has become the basis of syllable weight. A light syllable contains a short vowel, while a heavy syllable contains either a long vowel or a short vowel followed by a tautosyllabic sonorant (which in Nootka would have to be a nasal, since /l/ has merged with /n/, and the sequences V + /y/ and V + /w/ are not found). There are no diphthongs in Nootka.

Here we can see the value of the autosegmental description of Kwakiutlan syllabic structure given above. It is clear that Nootka works on precisely the same underlying pattern; the heavy vs. light distinction is made on a branching vs. non-branching nucleus contrast. Epenthetic vowels, which are rarer in Nootka than in Kwakw'ala, are handled as "floating vowels" in exactly the same way. The limitation on "superheavy" syllables, however, is slightly different. If Nootka were to maintain the expected pattern, we should expect to find any short vowel able to stand before a tautosyllabic nasal. In fact, however, it appears that

only /i/ can stand in this position. Not only are there no underlying morphemes with any other vowel in such position¹⁶, but we have a number of alternations, similar to those seen in Kwakw'ala, which indicate that this limitation is in effect:

taw'ana- 'lying crosswise upon', final form taw'in

c'asto-q- 'mink', final form c'astim¹⁷

We also find cross-linguistic alternations between Nootka and Nitinat, such as

Nootka ?ink(ʷ-) 'fire', Nitinat ?adk- 'id.

Nootka ?imin 'navel', Nitinat ?ibo:d, Makah q'iba:d 'id.'¹⁸
 This exception is historically quite interesting, since /i/ (or /u/ in rounding environments) is the normal Nootka reflex of a Kwakiutlan reduced vowel. It would appear that while Nootka has lost the category of reduced vowel in general, it still maintains the older restriction on possible vowels before tautosyllabic nasals, using /i/ as its de facto reduced vowel. This is a strong piece of evidence on the

¹⁶I exclude here such borrowings as pi:sme:n < English 'fisherman', which often violate phonotactic constraints.

¹⁷The "final forms" quoted here are nominalized forms made directly off of certain types of roots. While morphological endings are being apparently added here (the forms are unanalyzable), it is clear that the vowel alternations are not due to deletion or contactation, as the results do not conform to the standard rules for such processes (see below).

¹⁸The apparent exceptions to this constraint in Haas (1968), such as Nootka ʔo:m 'hot', are incorrect. Sapir and Swadesh give the form as ʔom-, ʔo:m- and ʔo:pa:, all of which are phonotactically acceptable. Other cases of exceptions turn out to be similar.

evolution of the Nootka quantity system from something like the Kwakiutlan system, rather than (as has been suggested) in the other direction.

The stress rule of Nootka is both more complex and more restrictive than that found in Kwakw'ala and Oowekyala. It can be stated as Stress the first syllable, unless it is light and the second syllable is heavy, in which case stress falls on the second syllable. There are no clear secondary stresses, and stress never falls anywhere but the first or second syllable (see exceptions below). The four possible patterns of syllable weight in the first two syllables thus show the following stress assignments:

L	L	<u>tíqwil?</u> a ¹⁹	'now he sat down'
L	H	t'así: <u>?ak'i</u>	'his door'
H	L	<u>?ínk'i</u>	'the fire'
H	H	<u>?ó:simc'a</u>	'now he trained at...'

Even if a heavy syllable occurs after two initial light syllables, stress in Nootka cannot normally be "attracted" onto it; in a form such as qwayec'i:k 'wolf', stress falls on the initial syllable by the standard rule, not on the heavy third syllable. The one exception to this is a rule which shifts stress onto a syllable which has lost the segment (X) before a hardening (glottalizing) suffix. Only certain

¹⁹Notice in this form, parallel to many of the Kwakw'ala forms, the sequence /l?/ is distinct from the single phoneme /l'/.

morphemes show this loss of final (λ), and the parentheses here are Sapir and Swadesh's indicator of the "moveable" form of this affricate. In these cases, accent can be attracted as far as the third syllable of a word. This special condition accounts for the stress assignment in forms such as

we?ico?a λ 'now he slept', from we?ic- 'slept' + -o(λ)
 inceptive suffix + 'a λ 'now'²⁰
ya:kxi?et '(something) of his became sore', from ya:k-
 'sore' + si(λ) momentaneous aspect + '-at
 inalienable possessive (> et after /i/)

The motivation for such a shift is unclear, though it might reasonably be seen as a kind of "compensation" for the segmental loss, or a phonetic reflex of the extra "focus" on the altered syllable.

Another type of exception to the general stress rule in Nootka involves a set of stems with extremely low semantic content, often called "placeholder" or "empty" stems. They generally take the place within a verbal complex for some noun which is given in full as a following separate word. These stems include ?o-, a general object marker translated "it, so-and-so, something", and the related stems hita- and hin-, general locatives usually translated "there". Unless reduplicated or otherwise subjected to morphological processes, these stems usually do not carry lexical stress. Whether such rejection of stress is due to the semantic poverty of the stems involved, some inherent weakness in the

²⁰The apostrophe before the hyphen is the standard indicator that the suffix "hardens" a preceding consonant, or inserts a glottal stop after a preceding vowel.

vowels of the stems, or (most likely) the possibility that such stems were until relatively recently separate words, it accounts for such forms as

?oyó?at?aχ 'now perceived so-and-so', from ?o- empty stem + -yo?at 'perceive' + '-aχ' 'now'

hitáqsiχ 'went into (somewhere)', from hita- locative + -aq 'to go in' + -siχ momentaneous aspect

In both cases, given an initial sequence of two light syllables, we would expect stress on the first syllable. Interestingly, when the locative stem hin- is followed by a consonant-initial suffix, it does take stress, as in hínč'iχwe?in 'now came there, it is said'. This same stem also receives stress when it is lengthened by a morphological process, as in hí:niso:?okčiχ, 'began to move up and down like a whale', with the stem vowel lengthened by the morpheme -o?ok 'be on one's way' (Sapir 1924).

Except for these two classes of exceptions, however, stress in Nootka appears to be regular. It is not, however, without further complications.

An interesting feature of Nootka phonology is the existence of so-called "variable vowels" in both roots and suffixes. These vowels appear as long when in the first two syllables of a word, and are short elsewhere. When they appear in roots, they are only identifiable as variable when reduplication changes their syllabic position within the word. Variable vowels are generally indicated by V(:). Examples include

-na(:)k 'having, possessing...'
?ona:k 'possessing it' but capacnak 'possessing a canoe'

-y'a(:) 'troubled by, with...'
t'ohy'a: 'troubled at the head, headache' but
capacity'a 'having trouble with a canoe'

caqi(:)c- 'twenty'
durative aspect caqi:c but distributive cacaqic

There is no method for predicting the occurrence of variable vowels, nor do they appear to be derived synchronically by any known process. Kwakiutlan cognates more often than not have reduced vowels where Nootka has variable vowels, but the correspondence is not sufficiently regular to make theorizing worthwhile at this point. The fact that these vowels are sensitive to lexical position established by syllable counting is extremely interesting, since it mirrors a number of other processes within Nootka in this regard. Specifically, a number of otherwise separate rules of Nootka distinguish between the first two syllables of a word and the remaining syllables. Before discussing a metrical account for Nootka stress, we should review some of these rules and the "prominence" which they appear to give to the first two syllables of a word.

A. Vowel contraction: In all the Wakashan languages, vowel-vowel sequences normally contract, though this may be blocked by morphological boundaries not relevant here. In the Kwakiutlan languages, such contraction always produces a surface long vowel, regardless of the quantity of the vowels involved. Remember that the long/short distinction is not phonemic in Kwakiutlan, but that the full/reduced distinction

is.

Kwakw'ala: ?om'ə-a 'that chieftainness' > ?om'a:
la-osdes 'go up from the beach' > la:sdes
la-ila:la 'to go about' > la:la:la

In the Nootkan languages, however, vowel contraction produces a vowel with the length of the longest component; that is, the resulting vowel is long if either of the original vowels were long, and is short otherwise:

Nootka no-?ato-ap 'the singing is stopped' > no?atop
?o-k^wi-a(:)s 'it is on the surface' > ?ok^wi(:)s >
?ok^wi:s
ya:-aɬ 'yonder' > ya:ɬ

The quality of the result of vowel contraction is predictable, it being the "stronger" of the two original vowels, with /o/ stronger than /i/ stronger than /a/. A general exception is that stem vowels take precedence over non-stem vowels, but there is an extremely interesting exception to this exception. The normal rule of quality, rather than "stem precedence", applies if the stem is one of a set of so-called "empty" locatives:

Nootka ~~ɬ~~awa- empty stem + -i(:)či(~~ɬ~~) inceptive + '-aɬ 'now'²¹
> ~~ɬ~~awi:či?a 'now came near', *~~ɬ~~awa:či?aɬ

Recall that these same "empty stems" generally do not carry the stress, even when the regular rules would assign it

²¹Note that this form involves the loss of a 'moveable' (~~ɬ~~) before a hardening suffix, which suggests that the stress would be shifted to the third syllable of this word. I do not know of any accent-marked tokens of this particular form, however.

to them.²²

If the vowels of the first and second syllables of a word contract, however, the result is always long, even if both of the vowels involved are short:

Nootka ?o-aqsti: 'within it' > ?o:qsti:
cf. ?o-?o-aqsti: 'within it here and there' >
 ?o?oqsti:²³

An important observation here is that, while the first syllable of a Nootka word will also be part of the root (since there are no prefixes), this exception to the general contraction rule cannot be reformulated in terms of root vs. suffix. Since roots can be theoretically of any length, and given examples such as ?o?oqsti:, above, it is clear that we must present this exception in terms of syllabic position.

B: Contraction across glottal stop

In all of the Wakashan languages, we find instances of

²²There is not a perfect match between the stems which reject stress and those which are exceptions to the contraction rule. The root ?o-, which rejects stress as we have seen, appears to contract normally.

²³Sapir and Swadesh state this exception to the rule somewhat differently (1939:237): "The vowel following the initial consonant of the stem has a special rule, that the contraction product is never shorter than variable; the fact of variable length is evident only when, through reduplication, the vowel comes to stand in the third syllable of the word...thus compare ?o?o:tah 'whaling' < ?o- + -atah with reduplication of the stem, ?o?o?otah 'whaling here and there' with another reduplication to expressive the distributive [aspect]." However, a review of the conditions for the rule will show that the simpler formulation is the equivalent of Sapir and Swadesh's rule, since their "variable length" vowel is simply another way of stating that the result of the contraction is long if in the first two syllables, and short otherwise.

vowel contraction across an intervening glottal stop. In the Kwakiutlan languages, this uniformly produces a long vowel and is indistinguishable from the contraction discussed in (A). In the Nootkan languages, the vowels of the first and second syllables of a word may not be contracted across a glottal stop. The second and third syllables may contract in this situation, and will produce a long vowel in all cases (in contrast to the previous type of contraction). Any other syllables which undergo contraction across a glottal stop will produce a short vowel in Nootkan:

Nootka maʔas 'tribe', no contraction possible
 reduplicated distributive from the same root
 ma-t-maʔas > matma:s with contraction and
 lengthening

Here we find quite a different pattern from the first type of contraction. Rather than showing a distinction in resulting quantity, the vowels of the first two syllables simply fail to undergo contraction at all. The second and third syllables then show a quantity contrast with the rest of the word. These differences, however, appear to result from other phonetic constraints within the Nootkan languages. If we assume that the phonological strength of the first two syllables relative to the rest of the word is shown by a total resistance to vowel contraction, then it is the facts in section (A) that require an explanation. In general, Vowel+Vowel sequences are not possible in Nootkan phonotactics; thus, the regular length found in type (A) contraction can be seen as a "compromise" between the strength of the positions involved and the impossibility of

avoiding contraction altogether. The length found in the second + third syllable contractions is best seen as a reflex of the general absence of long vowels after the second syllable as discussed above, or as simply indicating that the result of V?V contraction in Nootka has been reanalyzed as a variable vowel.

C. Vowel Deletion

In Nitinat and the Kyuquot dialect of Nootka (Rose 1982), short vowels may optionally be deleted if the phonotactics would otherwise allow the resulting consonant cluster. Such deletion may only take place, however, in the third or following syllable of a word:

Nitinat: ga:fa:tk 'younger brother', cf. Nootka ga:ta:tk
 Kyuquot: hayuči(:)ɬ 'it went on for ten days' > hayučiɬ

Note that in the second example, the variable vowel is treated as short, consistent with our statements of their treatment by the Nootka stress rule.

D. Iterative lengthening

One of the ways of marking the iterative aspect in Nootka involves lengthening the first two vowels in a word and shortening all others except the last. This last syllable generally consists of the morpheme -si:l, an iterative marker in itself:

Nootka: ?a:k^wa:mi:k 'a getter of eight animals'
?a:k^wa:mi:k^si:ɬ 'become a getter of eight animals at intervals'

In this process, the distinction between the relative strength of the first two syllables and the rest of the word

is emphasized by the set pattern of lengthening and shortening.

D. Makah

Our data on the stress system of Makah is extremely limited, but does seem to point to a consistent pattern similar but not identical to that found in Nootka. Jacobsen (p.c.) states that the stress rule in Makah is, "Stress the syllable containing the second mora of the word". This will place stress on the first syllable if it is heavy, and on the second syllable otherwise.

In the case of the variable vowels and all four of the processes found in Nootka, along with the stress pattern of Makah, none of which have any parallel among the Kwakiutlan languages, the same general pattern appears. The first two syllables are highlighted as a relatively stronger sub-domain of the phonological word. Why should the Nootkan languages have modified two apparently inherited rules of Wakashan phonology (A & B) and innovated two entirely new ones (C & D) in just this way? If we cast the Nootka stress rule in metrical terms and compare it directly with the rules we have posited for Kwakw'ala stress, we may find a motivation for such historical developments.

In metrical terms, Nootka builds a single (non-iterating) foot at the left margin of the word on a projection of branching syllables only. Thus if no heavy syllable exists within the domain of foot construction, than no foot can be built. Stress is then assigned by the left-

branching word-tree directly. Using the same examples given earlier, the Nootka stress-foot patterns would be:

2 1 0	(* . .) * * * L L <u>tiq^wiɬʔa</u>	2 1 0	(* . .) (. *) * * * * L H <u>t'asi:ʔak'i</u>
2 1 0	(* . .) (* . .) * * H L <u>ʔink'i</u>	2 1 0	(* . .) (* *) * * * H H <u>ʔo:simʔ'a</u>

Notice that there is no problem with the weak node of the stress-foot dominating a heavy syllable, as in the last example. This forms a contrast with the situation for jer-deletion in Slavic, in which the exact opposite is true (see Chapter Four). In the first form, tiq^wiɬʔa 'now he sat down', the absence of a heavy syllable leads to stress assignment by the left-branching level 2 foot. It should be pointed out that this solution would not be acceptable to some metrical phonologists, who would not allow the "skipping" of the foot level in the first example and the assignment of stress directly by the word-level structure. However, as we have seen, a number of diachronic and comparative cases point to this being a possible explanation for some stress assignment rules.

A direct comparison of the Nootka and Kwakw'ala stress rules shows that the primary difference between them is the presence of foot iteration in Kwakw'ala. This produces the obvious difference in secondary stress, but also allows Kwakw'ala main stress to appear anywhere in the word, while Nootka stress is limited to the first two syllables. Since

the development and loss of iteration within stress rules was one of the features suggested in Chapter Two as a type of change directly predicted by metrical theory, it is deserving of examination in detail in this case.

If we assume that the Nootkan stress rule is an innovation from a Common Wakashan rule similar to the rule found in modern Kwakw'ala, we have at least a formal motivation for the changes discussed above. The "fixing" of the main stress foot to the initial two syllables of the word creates a phonological distinction impossible in a language with a metrical structure such as the one found in Kwakw'ala: an "in-foot" vs. "out-of-foot" division of the phonological word. The first two syllables are thus marked by the prosodic phonology as distinct from, and relatively stronger than, the rest of the word.

Even the weak node of the single metrical foot, which could be seen as having the same lower prominence as the "out of foot" syllables, in fact appears to gain prominence by its membership within the stress foot. This is a crucial observation, since it implies that the opposition at work here is not stressed vs. unstressed, but stressable vs. unstressable. The lengthening of the variable vowels, the limitations on contraction and deletion, and the pattern of iterative lengthening all point to the relative prominence assigned to the syllables of the metrical foot.

The next question would then be, can we account for the loss of iteration in the stress rules of the Nootkan

languages? Again, a reasonable possibility is highlighted by a metrical approach to the problem. If we assume that Common Wakashan, like the Kwakiutlan languages today, had as its primary quantitative distinction not long vs. short, but full vs. reduced (with a non-distinctive long/short opposition), then the crucial change can be identified as the merger of reduced and short vowels in the Nootkan languages.²⁴ Without such a distinction, the inherited Wakashan stress rule would collapse. Specifically, the main stress foot, which earlier could theoretically appear anywhere in a word, would now always be built over the first two syllables. Thus, the quasi-fixed stress systems found in Nootka and Makah would be a natural result of the change in quantity opposition.

The loss of iteration itself need not have been caused by the same change, however. It would have been entirely possible for Nootkan to continue having an alternating pattern of secondary stresses after the main stress foot, parallel to the situation in Kwakw'ala. In fact, there is some evidence that some type of iterating metrical structure may still exist in at least the Kyuquot dialect of Nootka.

²⁴The exact fate of schwa in Nootkan is matter of some speculation. The vowel /i/ clearly behaves as a quasi-reduced vowel in Nootka to some degree; it appears to be epenthetic in a number of cases, and it alone can stand before a tautosyllabic nasal. The question is compounded by a variety of other changes in the Nootkan languages, such as the merger of /u/ and /o/ in Nootka and the loss of glottalized continuents and all nasals in Nitinat and Makah. Because of these complications, it is not possible to give a clear account of the exact development of reduced vowels in Nootkan at this time.

Rose (1982) mentions in passing that the deletion rule for short vowels in that dialect appears to have an alternating quality; the direction, however, seems to be leftward (that is, from the end of the word) rather than rightward as might be expected if the Common Wakashan metrical structure had survived. But such a pattern is not at all unusual from a typological viewpoint. There exist a number of stress systems which build a single metrical foot at one margin of the phonological string, and then build alternating feet from the opposite end (as in the Passamaquoddy example). It is possible that the unidirectional alternating pattern assumed for Common Wakashan has been reanalyzed in at least some Nootkan languages or dialects to be such a pattern, but the evidence is not sufficiently consistent to justify any firm statements in this regard.

Thus, the use of a metrical model in this case appears to add considerably to our discussion of the possible historical development of the Wakashan prosodic system. Specifically, the concept of the metrical foot as a basic organizing unit in phonology is crucial for this analysis of the differences between the Kwakiutlan and Nootkan stress systems. Additionally, Wakashan presents a clear example of the application of foot structure beyond the stress rules themselves to other categories in the segmental phonology. At least four separate processes in Nootkan make reference to the metrical foot, while none to my knowledge makes specific reference to the placement of stress itself. Let us continue

the discussion of cases of prosodic change in Wakashan by examining the development of pitch accent in Heiltsuq and the relationship of that system to the other Kwakiutlan accentual rules.

5.3 The Development of Pitch Accent in Heiltsuq

As mentioned earlier, Kortlandt (1975) has argued in a brief paper that Heiltsuq displays a phonemic tone system, and goes on to state reasons for assuming this to be the original prosodic system for Wakashan as a whole. In this section, I will present a basic overview of the prosodic system of Heiltsuq, showing why I believe it is best described as a pitch accent rather than a tone system. I will then discuss whether the system as described is an innovation or a retention, and finally how its relationship to the rest of Kwakiutlan can be accounted for.

Before turning to Heiltsuq itself, it will be helpful to look more carefully at two details of the general Kwakiutlan accentual system that become especially relevant when studying the placement of High pitch in Heiltsuq. These are the roles of resyllabification and glottalization in the determination of syllable weight.

Since a reduced vowel followed by a tautosyllabic sonorant (nasal or /l/) is treated as a branching nucleus, and thus counts as a heavy syllable, a morpheme of the shape CVR- will vary in weight according to the shape of the following suffix. If the next morpheme begins with a consonant, the CVR sequence will count as heavy (CVR.CV-); if

the following suffix begins with a vowel, the resonant will syllabify as the onset of the following syllable and the sequence will count as light (CV.RV). Thus, we have such alternations in Kwakw'ala as

n'ə́m-sGə́m 'one round object'

but n'ə́m-ó́k 'one person', n'ə́m-éx'á 'one vessel'

Similarly, if the final resonant of a CVR- morpheme is glottalized by any of the number of glottalizing processes in Wakashan, the syllable is treated as light:

gá́l-c'od 'to crawl into (s.t.)'

gá́l'-nák'ə́la 'to crawl along'

Notice that the presence of a glottalized segment after the resonant is not significant; the loss of syllabic weight occurs when the resonant itself is glottalized, as by the hardening suffix -nák'ə́la in the second example.

In Heiltsuq, all syllables are assigned a tone, either High or Low. The distribution of High tones is limited to two such tones per word, although if the second High associates with a vowel in the environment /____[+son]V, the High tone will spread to the following vowel. The placement of High tones is otherwise not predictable, and they may occur adjacent to or separate from each other. Kortlandt (1975) mentions stress as well as tone, stating that the main stress falls on the first High-toned syllable in a word. While the presence of such stress has not been confirmed by other researchers, it would only add to the likelihood of the model presented here being correct.

We can now use the specific conditions governing syllabic weight in Kwakw'ala to test the underlying similarity of the Heiltsuq pitch system. Given that the initial High tone in a Heiltsuq word never appears to the left of the position of main stress in Kwakw'ala, we have reason to believe that at least some portion of the inherited Kwakiutlan prosodic system is still in operation in Heiltsuq.²⁵ If the effects of resyllabification and glottalization can still be found in Heiltsuq, this would strengthen the argument for a common, weight-sensitive prosodic system as the common ancestor of both accentual patterns.

In fact, if we look at the Heiltsuq cognates to the Kwakw'ala forms given above, we find a symmetry between stress and high tone:

Heiltsuq m'ə́n-sGə́m²⁶ 'one round object'

²⁵ The statement that Heiltsuq High tone is never found to the left of Kwakw'ala main stress is not as strong as it sounds, due to the common deletion of reduced vowels in initial syllables of Heiltsuq. This eliminates a large number of possible tone-bearing units in Heiltsuq which might create contrasts with the Kwakw'ala system. On the other hand, this very deletion process points to the weak status of such reduced vowels at an earlier stage of Heiltsuq phonology, which is in itself an important parallel to the Kwakw'ala system.

²⁶ Here is an example of the metathesis in the root meaning 'one' (cf. Kwakw'ala n'ə́m-, Nootka n'up- with a common denasalization of morpheme final segments).

cf. m'an-(e)xá²⁷ 'one vessel', m'an-(e)xsá 'one flat object'

gál-k'ana 'crawl along a log', cf. gál'-lám 'weasel'

also tám-kwa 'tap with a stick' cf. tám'-cás 'snaredrum'

In the first examples, we see that the placement of high tone is (or was) sensitive to the same factors of syllable weight which condition Kwakw'ala stress. When the reduced vowel and sonorant are tautosyllabic (before a consonant-initial suffix), the stem receives High tone; when the sonorant resyllabifies, the stem has Low tone. Glottalization prevents the occurrence of High tone precisely as it removes stress in Kwakw'ala, as the second set of examples shows.

Certainly, quantity sensitive pitch accent is not in itself an unusual type of system, as we have seen in Chapter Two. Yet the extremely close match in details of the two systems would indicate that we are dealing in both cases with a fairly direct continuation of the inherited Kwakiutlan (if not Wakashan) prosodic system. Given the universal agreement on stress as the primary marker of accent in the rest of the family, we must assume that Kortlandt's claim for the originality of tone to be mistaken. We are then confronted with the necessity of explaining the change from predictable

²⁷ The schwa in parentheses found in these forms is not given by Kortlandt (1975) from which these data are taken. Their presence is certain, however, because of the forms resulting when these suffixes are added to the root mu- 'four': muw x a, muw xsa. This breaking of /u/ to /uw/ is a regular process in all of Wakashan, but occurs only before vowels. Thus, I take Kortlandt's forms without initial vowels as incorrect divisions of the morphemes.

stress to phonemic pitch accent in Heiltsuq.

Our most intriguing clue pointing the mechanism of such a change comes from the dialect split found in Haisla, a language which appears to occupy the phonological middle ground between Kwakw'ala and Heiltsuq. As we have mentioned, two distinct accentual patterns were found in Haisla by Lincoln and Rath (1980). As they describe it,

The accent is actualized as either stress or as low tone surrounded by high tones, the pitch level of which is higher the closer one is to the word-boundaries. Our consultant G.W. always pronounced with stress, while R.W. would dictate single lexical words with stress, but switch to tone as soon as the words were changed into one-word sentences by means of a grammatical suffix or when the words were used in a longer sentence (p. 27)

In their 1986 dictionary of Haisla, the same authors go into much greater detail on the split of accentual systems. On the pitch accent, they give the following description:

1. If the accent falls at the beginning of the word, its musical actualization consists in a low tone of high intensity²⁸ which contrasts with one or more following high tones of low intensity...if there are phonetic [i.e. reduced or epenthetic] vowels prior to the accented [vowel], these vowels either participate in the low tone (but not in its intensity) or have a somewhat higher tone....
2. ...[W]ord medial accent consists in a low tone of high intensity against a background of high tones....
3. If the accent falls in the final part of the word [i.e. the last syllable], both of the following two patterns can occur...no difference in tone or intensity between the phonetic vowels in the word, the pitch level of the uniform tone being perceived as low...relatively low

²⁸I am not sure what the authors here mean by "intensity", though I assume that it is most likely an indication that some degree of stress remains on this syllable.

tone with low intensity on all phonetic vowels except that the accented [vowel] is given prominence by a drop in pitch level accompanied by increased intensity followed by a rise in pitch level and lowering of intensity. (1986:39-40)

How can we describe such a pattern of accentuation. Let us assume that the "background" of High tones described for Haisla comes from a floating High tone associated with the left word boundary, as in

Ⓜ []_{word}

The lexical accent can then be identified with a Low-High sequence, with the low element associated with the accented vowel itself. If the High tone is now able to spread to the right, this would account for the sequence of High-toned syllables which always follow the accented syllable. Likewise, the floating High at the left margin of the word would normally be free to spread rightward up to the pretonic syllable. Phonetically, Lincoln and Rath indicate that the transition from High to Low and back to High is gradual, with predictable Mid tones appearing on syllables immediately before and after the accent. In words with final accent, the High component cannot be associated with a tone-bearing unit of its own, and so apparently forms a rising pitch contour on the final vowel²⁹:

²⁹That is my understanding of the phrase "a drop in pitch level...followed immediately by a rise in pitch level" when applied to the final syllable of a word.

When the accent falls on the first full vowel in a word, the spread of the floating High appears to be in free variation with an alternative form in which no spread takes place. The difference seems to be based on whether introducing a High tone on such unaccentable syllables is allowable or not. This lack of spread is one of the reasons I have not simply assumed that the pitch accent itself is a High-Low-High sequence that spreads in both directions. The other argument such a theory comes from the behavior of reduplicated forms with final accent (Lincoln and Rath 1986:41). The initial, reduplicated syllable is often given a higher tone than the rest of the word, though the medial syllables remain at a somewhat higher pitch than the accented syllable.



Now, in all of Wakashan a reduplicated element is often treated as set apart from the rest of the word for the purposes of some phonological rules; there appears to be a reduplicative boundary of some degree. It would thus be extremely strange for a leftward-spreading High tone to suddenly "spike" when crossing such a phonological boundary. It would be much more reasonable for a floating left-margin tone to downstep at such a boundary while spreading rightward.

If this autosegmental picture of Haisla pitch accent is accurate, we have a system which appears almost identical in

broad outline to the pitch accent system of Tokyo Japanese (see Chapter Six).

Lincoln and Rath make another interesting observation on the stress-based version of Haisla accent. In this dialect, stress often spread leftward in a word onto all segments capable of bearing stress through the initial syllable. Such spreading patterns are quite unusual in pure stress languages, since stress systems tend toward alternating patterns rather than spread. As I will argue for the case of Russian, such spreading rules often indicate a historical tie to a pitch-based system; while Russian appears to be a stress accent evolving from pitch accent, I would argue that Haisla is most clearly seen as a language moving toward pitch accent from a stress system.

This is most clearly seen by the third feature of Haisla accentuation: the "quasi-phonemic" nature of the stress. Unlike Kwakw'ala, in which stress placement is essentially exceptionless and Heiltsuq, in which minimal pairs based purely on pitch distinctions are common (though, as we have seen, there are still patterns of predictability), Haisla accent has some clear rules of placement and many forms in which accent must be stipulated. In general, the rules we can deduce for Haisla stress are consistent with Kwakw'ala: stress tends to fall on the first full vowel in a word. Examples include

c'ám'á 'to point' gán'á m 'female'
q'ámksiwa 'white man' hápa 'to dig for clams'

but there is nowhere near the degree of predictability found in Kwakw'ala (cf. Haisla minimal pairs such as m'iχ a 'to miss the target' and m'iχ á 'to make a mistake'). This makes Haisla the only phonemic (or semi-phonemic) stress system in Wakashan.

We must then attempt to determine the mechanism by which such a shift from a stress system to a pitch-accent system has occurred. If Wakashan had a fully developed tone system, the answer would be simple. We would assume that the lexical tones had become associated to the most salient positions within the metrical grid (i.e. the stressed syllables), as has happened in a number of African languages. But there is no evidence for such tonal elements playing a role in the lexical phonology of any Wakashan language at present. We must search elsewhere for the tonal features needed in our model.

The distinction between isolated utterances and fluid speech found in the "pitch-accent" dialect of Haisla may point to a connection between the use of pitch as an accentual marking and the intonational patterns of the language. Since we would naturally expect intonational patterns to be fully implemented only in longer phonological phrases, this would seem to be a relevant difference between the suprasegmental detail of isolated tokens and connected speech. If Haisla speakers show pitch accent only in an intonationally rich speech variety, it stands to reason that pitch accent itself may have arisen as a fixing of pre-

existent tonal contours onto the position of greatest phonological strength, i.e., the accented syllable. The work that has emphasized the "pitch accent-like" qualities of English (Bolinger 1972, Selkirk 1980) has similarly focussed on the interplay of accent and intonational melodies. We may see in Heiltsuq a further development of such interaction.

If such a theory may be able to account for the growth of pitch accent out of stress, then we need to continue of questioning by examining the phonemic nature of Heiltsuq pitch accent. If all of Wakashan maintained a phonetic stress, why has accent in Heiltsuq become distinctive? I believe that we can identify two important factors in this change.

First, we should examine the effect of the deletion of initial-syllable reduced vowels in Heiltsuq. Unlike the merger of reduced vowels with short vowels in the Nootkan languages, the total loss of such vowels in initial syllables in Heiltsuq created a direct violation of the syllabic canon of Wakashan. Only in these cases would syllables with an initial consonant cluster be found. If such a change led to confusion on the general rules of syllabification throughout the language, it may be that the rules of accentual assignment became unclear. It is certain that, when looking at the pitch features of suffixes in Heiltsuq, there is a fairly regular mapping of High tone onto syllables that are invariably heavy. If we assume that, due to the breakdown of the older syllabic canon, accent was reassigned to all

heavy syllables rather than in an alternating pattern, the shift to pitch accent would have only compounded the confusion.

As we have seen, pitch accent is more likely to spread to adjacent syllables, while stress tends to alternate in accordance with the perfect grid hypothesis; Heiltsuq itself shows such pitch spreading in cases of a High toned vowel followed by a RV sequence. Heiltsuq would therefore be more likely to lose alternating accent as the salient marker of that accent was more and more identified with pitch rather than stress.

Under such a theory of development, almost any number and any pattern of High tones would have been possible in a word. It is obvious that under such a system, the older Wakashan accentual pattern would have been totally obscured. If Heiltsuq then developed its pitch deletion rule, limiting a word to two underlying (and three surface) High tones, a reshuffling of accents would have inevitably taken place. This would, it seems, be most likely to result in exactly the relationship which we find between Heiltsuq pitch accent and Kwakw'ala stress: clear parallels in both the broad outlines and some specifics of the systems, but enough re-assignment of accentual markers to prevent true predictability in terms of the older system.

We must consider another possible source for phonemic accent in Heiltsuq, acquisition through language contact. Heiltsuq, as the northernmost Wakashan language, is in the

most direct contact of any language in the family with a variety of Athabascan languages in British Columbia which make use of phonemic tone. The closest of these languages is Carrier, described by Eunice Pike (1975). While the system she describes is quite different from that which arose in Heiltsuq, having three tonal levels and no limitation on High tones within a word, it cannot be discounted that exposure to any system in which tonal distinctions could create differences in meaning could have encouraged such a change in Heiltsuq. The facts of language contact in this region are unfortunately not well known, forcing us to consider any further ideas along this line as pure speculation.

5.4 Conclusion

Wakashan presents us with a number of examples of prosodic development that have been discussed only briefly in the accentual literature. In comparison to the available literature on tonogenesis, such shifts of accentual patterns have received little notice. This makes the changes found in Wakashan especially important.

Let us sum up the proposed pattern of change in the various Wakashan languages. I assume that Common Wakashan had a predictable stress accent, very close to the system found today in Kwakw'ala. From this common source, all of the other systems can be derived. ?O?owekyala, for example, has maintained in broad outline the inherited system, but has lost a degree of predictability, apparently for the same reasons which produced phonemic pitch accent in Heiltsuq.

While the possible causes for the shift to pitch accent in Heiltsuq have already been mentioned, it should be pointed out that it has maintained the same basic segmental inventory as Kwakw'ala, and makes distinctions of syllabic weight on the same criteria.

Nootka, on the other hand, underwent a complete overhaul of its phonemic inventory with the loss of reduced vowels and the other shifts we have seen. This would have destroyed the older weight system, and thrown the accentual system into disarray. It would have been entirely reasonable for Nootka, at this stage of its development, to have developed phonemic stress. Instead, the older non-phonemic system adjusted to the new syllabic inventory by the loss of iteration; this grew out of the "fixing" of the older accent on the first syllable due to all syllables being "heavy" by the old definition.

Why then did Nootka not simply develop fixed initial accent? Such a result would fit in well with the apparent history of such language groups as West Slavic and Celtic as discussed in Chapters Four and Six. There can be no certain answer, of course, but it appears that the definitions of heavy and light syllables caught up with the new vocalic inventory in time to keep quantity sensitivity as a basic part of the system. Nootka can be seen as having as its current accentual rule a kind of compromise system which developed as a reaction to a misfit between stress and weight at some point in its history.

The histories of Heiltsuq and Haisla on one hand and Nootka on the other give us examples of the two basic types of prosodic change we proposed in Chapter Two. Heiltsuq, in comparison with the proposed older system, appears to have undergone a radical change, but it is largely cosmetic. In the majority of cases in which Heiltsuq High pitch still corresponds to Kwakw'ala main stress, the contrast between stress and pitch as markers of accentuation is not significant. The phonemicization of the accent, and the addition of the two-accent limitation, are by far the more radical and interesting pieces of the puzzle.

Can we find other such examples of the growth of pitch accent out of an earlier stress system? As I will argue in Chapter Six, similar types of development seem to have happened in some of the pitch-accent systems of Africa, and the outlines of a description of the history of Japanese along similar lines can be presented. In both of these cases, however, it would appear that tonal elements were already part of the lexical phonology of the languages, and that metrical structure had the effect of anchoring certain tones (or, in Japanese, sequence of tones) to certain locations within the word. Heiltsuq is unique in having drawn its tonal elements from the phrasal intonational inventory, if what I have suggested earlier is correct.

Nootka, in contrast, has kept the older marker of accent, but has undergone a change in the rules of the metrical system itself. Such a loss of iteration has been seen

in the examples of Italic and Slavic in the two previous chapters; since it keeps appearing, we might stop for a moment to postulate a general motivation for such a change.

The most obvious factor which would press for the loss of iteration in a metrical framework would be functional, the delimitative role of lexical accent. This is clearest in the examples from Italic, but may also play a role in Wakashan as well. The loss of iteration will, by definition within the current model, lead to a single metrical foot at one margin of the phonological word. Given the most common sets of parameters for the construction of feet, this will result in fixed accent on the initial syllable or on the penult. Either position will be a clear indicator for a delimitative function.

Within Wakashan, the complexity of the polysynthetic morphology makes a reliance on the delimitative function of lexical accent appear especially likely. We should, in fact, see non-iterative systems as the rule rather than the exception under this criterion.

Thus, for Italic, Slavic, and Wakashan, the changes observed in the overall prosodic systems are entirely consistent with the model of change suggested. The following chapter gives three smaller studies to round out the discussion, and brings this work to its conclusion.

Chapter Six: Further Examples and Conclusion

The three examples of prosodic change presented in the first part of this chapter are shorter and of more limited purpose than those given earlier. This is not because the languages themselves have particularly simple prosodic systems; the accentual facts and historical developments of Japanese or a small selection of the Bantu languages could easily fill several volumes. I present here only a single feature of each to complement the fuller discussions of the earlier chapters.

Section one presents a comparison of the prosodic systems found in Celtic, and specifically in Old Irish and Welsh. We find in this case an apparent mirror-image development within an inherited stress system, parallel in several ways to the situation between Czech and Polish described in Chapter Four. This provides a starting point for a fuller discussion of what sort of changes may underlie the creation of such a pattern. While I assume that the Celtic accentual systems represent a clear evolution of the Indo-European metrical grid, I will limit my presentation to this specific mirror-image question; thus, I place the Celtic facts here and not in Chapter Four.

Sections two and three look at two separate cases involving the rise of pitch accent from an earlier tonal system. In section two, I present some of the intricacies of the Japanese accentual dialects, and show how metrical structure may have played a role in their historical

development. In section three, I use data from a number of Bantu languages to illustrate a similar evolution. The goal is to further exemplify the general principles of prosodic change given in Chapter Two.

6.1 Mirror image Prosody in Celtic

The Celtic group of Indo-European breaks into two main sub-groups, Brythonic and Goidelic. Welsh and Irish may be used as representative members of each group respectively. As will we see, while there is strong evidence that the accentual systems of both languages has evolved from a single ancestor, the Common Celtic version of the proposed Indo-European metrical grid, the attested systems of Irish and Welsh have developed in opposite directions, leaving them near mirror-images of each other.

In Welsh, penultimate stress accent is the rule in the modern language, and appears to have been the standard accent of the reconstructible stages of the older Brythonic group in general (Williams 1980; Jackson 1951). It should be noted, however, that the position of accent itself has shifted between the older and newer versions of the language because of a general truncation of final syllables. Thus, the modern accent falls normally on what would have been the antepenult in the Brythonic word.

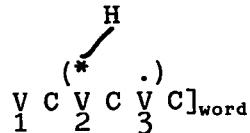
This simple system is complicated by three special considerations. First, many prefixes receive a secondary stress, as in án-nibýnnol, dí-gyffélyb, and gwrth-wynébu. Second, surface final stress is found in a number of forms.

This may almost always be accounted for either as a result of contraction (e.g. Cymrâeg < Cym-rá-eg) or due to the weak pronunciation of the vowels in some prefixes (e.g. the ys- in ystryd or ystén, often pronounced stryd and sten; Williams (1980:5)).

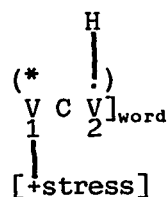
Third, and most interestingly, there is a surface mismatch between perceived stress accent and higher pitch in modern Welsh. While the stress itself is penultimate, Jones (1949) shows that final syllables receive both the highest pitch of the word and some degree of secondary stress, so that non-Welsh English speakers have some difficulty in determining the actual stressed syllable. Given the "shift" of penultimate accent due to the loss of original final syllables, it is tempting to see this final syllable prominence as the relic of the older, pre-loss, accent placement, as Jackson (1953) believes.

Such a retention of the older placement of accent by a subset of the accentual markers is a great interest, since it would contradict the general process of eliminating "prominence clash" which we have seen in a number of examples. It also would serve as a clue to the type of accentual marker employed at the earlier and later stages of the language, since pitch is more directly tied to the former rather than the latter. If such an assumption is correct, we would have a fascinating example of the bifurcation along temporal lines of the metrical and tonal subsystems of Welsh prosody. If we assume that, before the loss of final

syllables, the accentual system of Old Welsh could be described as



with metrical pitch accent, then the later stage would be formalized as



with the conflict between metrical and tonal prominence. Such a clash, under the theory presented here, could only be explained as involving such a development as presented here, and the inherent instability of such a system would be quite high. The secondary stress found on the ultima in Welsh could be described either as a "in foot" distinction as argued for Nootka, or as a spread of stress rightward as a partial attempt to rectify the prominence clash. The Welsh example, while codifiable within the current framework, also stands as an extremely interesting challenge to it.¹

¹While I will not be discussing the Continental Celtic languages to any great degree in this section, it should be pointed out that there is evidence for a stress accent in Gaulish which fell either on the penult or antepenult. While the rules for such accentuation are unclear, we can see its effects in such forms as Bayeux < *Bodiócasses, Troyes < *Trícasses, and such alternations as Bourges < *Bitúrīges vs. Berry < *Biturīges, or Conde < *Cōndāte vs. Condes < *Condāte. (Meyer-Lubke (1901); Koch (1987))

On the Goidelic side of the family, our primary interest will be the stress system reconstructed for Old Irish on the basis of an extremely strong syncope pattern found throughout the language (though most noticeable, for a number of reasons, in verbs). Stress is not marked directly in any of our sources for Old Irish, and we have already argued in Chapters Two and Three that syncope and other segmental alternations need not always be accurate indicators of stress placement. In this case, however, there is no reason not to accept such processes as evidence for stress, given the accentuation of the modern language and the close resemblance of Old Irish patterns to those found in other IE languages.

Before discussing the pertinent examples of syncope itself, it will be necessary to mention two other relevant changes which occur in Old Irish. First, a general process of vowel reduction applies to all non-initial syllables (cf. the occurrence of vowel weakening in Latin). While this is usually presented simply as a process of shortening, it clearly involves the loss of all or almost all distinctive features in vowels in medial syllables. Except for vowels "re-lengthened" by compensatory lengthening or the effects of following sonorants, the quality of all vowels in non-initial position is determined by the features of the surrounding consonants (Thurneysen 1961:63). Vowels which maintain or gain length do show inherent quality, as do all vowels in stressed syllables.

Second, it is clear that certain final syllables have

been lost, apparently through some type of syncope or vowel-reduction process. As summarized by Thurneysen (1961:58ff), all vowels in absolute final position were lost, and short vowels before certain final consonants were also syncopated, taking the rest of the syllable with them. Thus, we have reason to argue for a general prosodic weakness for the final syllable at an early stage of the system.

After the effect of these changes, syncope may apply to any word still containing at least three syllables. In general, vowels are syncopated in all non-final even-numbered syllables. Because of the length of Old Irish words, this rule will most often apply simply to second syllables, but cases of syncope in fourth syllables are also found:

cosmil < cosamil écsamil < écosamil
écsamli < écosamali -derscaigfet < -deroscaigaifet

This syncope may be contrasted with that found in Italic in a number of respects. The primary difference is the total lack of quantity sensitivity in the Irish rule. The vowel shortening in non-initial syllables rules out vowel length as a consideration, but even vowels in heavy syllables may be syncopated in Irish. The direct syllable counting from left to right also contrasts with the more complicated situation in Latin, though it can be seen as essentially a mirror-image of the Oscan-Umbrian rule.² Finally, the complete lack of

²"Mirror-image" here applies only to the directionality of the rule; in both systems the metrical feet would be left-headed.

syncope in final syllables in Irish can be compared to the situation in Oscan and Umbrian, where such syncope is common. Of course, it appears that final syncope had already applied in a wide range of cases in Irish before the historical period, thus bringing the two systems into greater agreement.

If an Old Irish verb had one or more preverbal elements, the rules for syncope were slightly more complicated. In general, the first preverbal element does not count in the syllable-count for purposes of syncope. Thus, if a verb has only a single preverb attached to it, the pattern of syncope will be the same as found in the unprefixing verb (though, because of morphological alternations within Old Irish, the verb will usually show a different set of endings in prefixed and unprefixing forms). We can see the results of this condition on syncope in the forms of the verb gair 'calls' (McCone 1989:2) (the first preverbal element is parenthesized):

gairid (no syncope, since the second syllable is final)

(for)congair but (ni)forngair

(do)airngir <do-air-con-gair, but

(ni)tairngir <ni-do-air-con-gair

This alternation is the origin of the "prototonic" and "deuterotonic" division between forms of a verb. The standard explanation of this change is that primary stress, which normally falls on initial syllables on unprefixing verbs, shifts as far to the left as possible in prefixed forms; the first preverb, for unknown reasons, was incapable

of bearing the accent. This leftward shifting of accent can be contrasted with the situation found in Greek, Vedic, and Slavic, in which recessive accent can move as far left as the preverb immediately preceding the root, but no further. The Irish equivalent is thus the more lenient of the two restrictions, since the accent may shift leftward two, three, or even four morphemes.

If the assumption that syncope is based on the positions of primary and secondary stresses is correct, it is clear that the metrical structure needed to describe such a stress accent would be irrelevant to the rule of vowel reduction mentioned above. Unlike the process of syncope, which clearly operates in an alternating pattern and would thus be described using binary metrical feet, reduction appears to be sensitive only to the position of the first stress in a word. The vowels of all other syllables, either pre- or post-tonic, are eligible for reduction. Thus, this rule would be best described through reference to a single unbounded metrical foot, headed by the syllable receiving the leftmost stress.

Of course, both of these types of feet would be used in describing Old Irish stress under a stress grid model. The formalization of such a system would be so straightforward as to be practically vacuous:

level 2	(*)			
level 1	(*	.)	(*	.)	(*)
level 0		*	*	*	*	*			
		C	V	C	V	C	V	C	V

The level one asterisk on the final vowel of this schematic

is not a strong degenerate foot, but is a preassigned marker of relative strength. This is one possible way to indicate within the model that final syllables are never eligible for syncope. The other option would be to make all final syllables extrametrical, only rejoining them to the metrical structure after syncope has applied. I reject this option for two reasons. First, it would appear that such extrametricality would make final syllables ineligible for vowel reduction, which is incorrect.³ Second, the pre-assigned asterisk would be truer to what I believe is the origin of the lack of syncope in final syllables: an earlier metrical foot on the right margin (see below).

If we employ such a metrical description of Old Irish stress, and compare it to the simple, non-iterating final foot constructed for Welsh, we are struck by both the similarities and differences between the two systems. Both build binary, quantity-insensitive, left-headed metrical feet. But Irish builds an iterating structure starting from the left, while Welsh has a single foot on the right margin. Why would the two branches of Celtic develop metrical systems

³If we interweave the subrules involved in the construction of metrical structure with the rules governing syncope and reduction, we could get around this problem as follows:

- a) Mark the final syllable as extrametrical
- b) Assign level 0 asterisks
- c) Build left-headed binary feet from right to left on level one.
- d) Syncope
- e) Erase extrametricality and build left-headed word-foot on level two.
- f) Reduction.

working from opposite directions from what must be assumed to be a single prosodic system?

As we have seen, such developments are not overly rare. The loss of iteration leading to the survival of a single, marginal foot has been exemplified several times in the course of this study. What makes the Celtic example of interest is that the Welsh foot would be the last foot in the metrical structure of Irish, contradicting the generalization that it is the first foot that survives when iteration is lost. There is good reason, however, for not assuming that the Old Irish system can be reconstructed for Common Celtic.

The evidence we have seen from a number of other Indo-European families, specifically Italic, Greek, and Slavic, all points to a common metrical structure building binary feet from right to left rather than left to right. While the initial feet suggested for Latin and Vedic, as well as a similar structure that we would posit for Germanic, might appear to argue against such a leftward directionality, it does not in itself present a real counterweight. Since the development of a single fixed foot in initial position as a result of a re-interpretation of certain predictable features of marginal syllables has already been suggested for these languages, the question of overall directionality remains open. If we attempt to derive both the Irish and Welsh patterns from our suggested IE pattern, the process turns out to be an easy one.

For Welsh, two changes are necessary. Syllable weight

is no longer relevant for foot construction, and iteration has been lost. The first of these changes is likely to feed the second, since the breakdown of quantity sensitivity would have led to a stress-assignment pattern with numerous clashes between metrical prominence and what might be called "weight prominence". A system which stressed a number of syllables regardless of their weight status is less intuitive than a system with a single metrical prominence determined by syllable count.

For Irish, we must also posit a loss of quantity sensitivity, but not of iteration. Instead, we find a re-alignment of the foot structure anchored on the leftmost rather than the rightmost foot.⁴ Given the regular prominence of the initial syllable predicted by the IE grid, and the parallel development of initial feet in Latin and Vedic, it would not be surprising for Old Irish to simplify its metrical component by eliminating the need for bi-directional foot construction. The result would be a left to right pattern as attested by the syncope pattern.

The proposed Indo-European grid, in its variant form with a fixed initial foot, provides the type of underlying

⁴Koch (1987) suggests that the move to initial accent in Irish can be traced to the clitic status of most finite verbs in main clauses in Vedic (and reconstructed for IE). This produces the pattern "accented preverb + Verb" in these cases, and could have provided a model for a general shift of accent leftwards. Of course, the metrical model used here is simply a formalized statement of the same facts, since Vedic accentuation shifts have also been discussed in metrical terms.

system needed to account for such an accentual divergence between Irish and Welsh. Since the first and last feet in a word will both have claims on special status, a general process of marginalization of (main) accent is not unlikely. If this is the origin of such "mirror-image" patterns as we have found in Slavic and Celtic⁵, then two questions immediately arise for the framework employed here. First, how does such a process of marginalization relate to the marginal qualities of extrametricality within a theory of metrical phonology? Second, what pressures within the overall phonology of a language would lead to the loss of iteration in the rules of foot construction?

The first question was touched on briefly in Chapter Two, but deserves a fuller exploration. As mentioned earlier, Goldsmith (1990) associates extrametricality with the condition of prosodic licensing. Under this condition, elements within a phonological domain must be associated with metrical structure in order to surface; extrametricality allows a temporary exclusion from the structure, but the extrametrical elements must be reincorporated before the end of the phonological cycle or be deleted. Obviously, if non-marginal elements were allowed to be extrametrical, their reincorporation into the metrical structure would disrupt the patterns established by the regular rules much more severely

⁵Possibly also in the history of Indic, since Hindi has penultimate accent, compared with the initial foot posited for Vedic.

than would the addition of elements on the edges of the structure. Thus, licensing itself would provide a motivation for disallowing medial extrametricality.

As we have mentioned, historically, extrametricality often appears to coincide with positions which cannot act as the head of a full metrical foot. While this would be true of a large number of elements within most types of accentual systems, such as light syllables in some quantity-sensitive systems, only on the margins of prosodic domains would the predictability of foot structure be sufficient to allow the development of a special status for the elements involved. Thus, extrametricality can be seen as a type of prosodic relic, the synchronic reflex of an older predictability.

The Celtic examples raise some interesting challenges to any overly simplistic version of this theory. In Welsh, we can argue that the loss of final syllables in the oldest stage of the language was prompted by the penultimate accent, which left all ultimae in metrically weak positions. This would be an ideal situation for the development of extrametricality, and we might assume that such a change occurred before the loss of final syllables. This would give us the historical pattern:

1. Original final metrical foot assigns high pitch and stress to penult.
2. Final syllables become extrametrical; stress but not pitch shifts to new metrical prominence determined by same foot shifted one syllable to left.
3. Final syllables drop.

This pattern, however, has a major flaw. The easiest way to

account for final syllable loss is through the presence of the penultimate stress; under this chronology, stress would have already shifted to the antepenult before final syllables were lost. Since extrametrical elements are not inherently "weak", there is no reason to assume deletion based purely on that status (cf. the survivability of *ultima* in Latin).

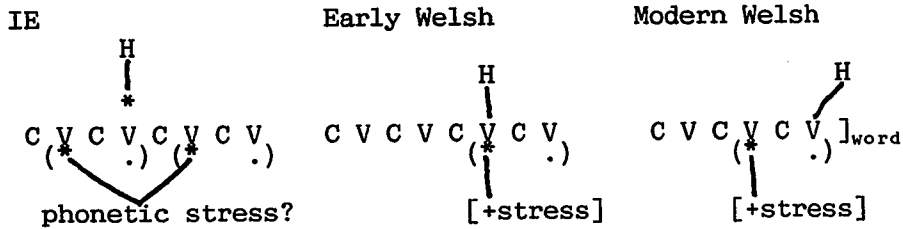
It could be argued that the lack of shift of pitch in Welsh could imply that extrametricality did play a role at the time of the stress shift. If only the stress-assignment rules were sensitive to the extrametricality condition, while the pitch-assignment was not, it would predict the kind of split system seen in Modern Welsh. But this solution is unattractive since it involves two overlapping metrical feet, one for pitch and one for stress. This is considerably different from the parallel metrical systems we have argued for in Passamaquoddy and Russian. Instead, it might be preferable to conclude that the lack of shift in pitch indicates that it is no longer sensitive to the metrical grid at all by this point in Welsh history, and is simply assigned to the right margin of the word by normal association rules. If so, Welsh would be an example of an inherent pitch accent system (IE) moving to metrical pitch accent (Brythonic, Old Welsh?) to a stress system in which the old pitch marker survives as a kind of intonational element with demarkative function. This might be seen as the opposite evolution from that found in Heiltsuq.

Thus, with regards to the question of extrametricality,

a more likely development in Welsh would be:

- a. Old system
- b. Final syllables, universally weak, drop.
- c. Simultaneous shift of stress to new penult; high pitch disassociates from metrical structure.

In metrical terms,



without a need to posit a stage with extrametricality at all.

In Irish, we have a number of questions raised about how to deal with accent and syncope through extrametricality.

We have already argued against an extrametricality analysis of the lack of syncope in final syllables in Old Irish. We may now compare it to the situation in Welsh. In both cases, the syllable which now stands in final position, whether the original ultima (only in Irish) or penult, is phonologically stronger than might be expected. In the Irish case, an original final syllable generally survived only if it had contained a long vowel, though such a vowel does undergo shortening and reduction normally. The best explanation for this strength in Irish is to assume the existence of a final metrical foot identical to the Welsh structure, which assigned metrical prominence to the old penult. The fact that this prominence survives even when the old ultima was lost may indicate that the prominence involved a tonal rather than a stress feature. The originally long

final syllables would then have developed resistance to syncope by analogy with the now-identical forms which underwent final syllable deletion.

If such a case for a final foot turns out to be correct in Irish, it brings the metrical structure of that language much closer to the assumed IE inheritance than it might at first appear. With a strong foot at each margin of a word, the older right to left directionality of the foot construction rule would be obscured. All that would be necessary to account for the attested system would be a shift from the IE pattern to a straightforward left to right pattern, which would still maintain the predictable strength of the now final syllable.

Questions still remain, however, concerning the treatment of preverbs. Why should the very first preverbal element alone be ineligible for stress? A general rule of initial extrametricality would need to distinguish between preverbs and verbs, since we do not find extrametricality applying to unprefixed forms at all. Instead, it would appear that the answer is morphological rather than phonological. The first preverb in a verbal complex appears to maintain a greater degree of independence than the rest of the prefixes (McCone 1987), and appears to be treated as a quasi-independent unit with regards to the metrical structure. This separation can be seen in the separately stressed prefixes of Welsh, mentioned at the start of this section. Thus, there does not appear to be any basis for the

use of extrametricality here, or in any of the examples which we have seen in Celtic.

On the second question raised, concerning the motivation for loss of iteration in the first place, we can only suggest several broad ideas. Certainly the issue of learnability, both in terms of children and of second language acquisition, creates constant pressure for the simplification of prosodic features, as it does in all areas of the phonology. A more unique drive for the prosodic system can be seen in the basic concept of prominence itself; if a system marks an element with main stress for whatever function, the salience of that marking is only increased if secondary members of the prominence hierarchy are further reduced in status. Especially in cases of stress taking on an increasingly delimitative role, or where stress alone functions as a phonemic determinant with minimal pairs, it is logical for the distinction between the apex of the prominence grid and all other positions to increase, until a state of non-iteration is reached.

In conclusion, the stress systems of Old Irish and Welsh, at first apparently unrelated, can both be seen as natural outgrowths of a Common Celtic system, itself similar to the IE grid proposed in Chapter Four. The "mirror-image" relationship found between related prosodic system both here and in Slavic can then be seen as a result of different possible choices in the overall process of marginalization of metrical structure. There is no reason to assume any kind of

"switch" from one attested system to the other, since both are subsets of the original, more complex metrical pattern.

6.2 Metrical influence on accent patterns in Japanese

As we have seen in the discussion in Chapter Two, the prosodic system of Standard (Tokyo) Japanese is a textbook example of inherent pitch accent. Other modern dialects of Japanese show more or less complex prosodic systems, some of which appear to be closer to the accentual system found in our oldest records of Japanese. Dating to the early twelfth century, these accent-marked texts allow us to double-check our assumptions about the history of accent within the language as a whole, and are an invaluable source of information about the typological shifts found among the modern dialects.

In this short review of some of the Japanese accentual facts, I will not be able to do more than present a broad outline of what is by far the most complicated area of Japanese phonology. I will begin by summarizing the facts of the main Japanese accentual dialects, and describing each in metrical and autosegmental terms. I will then review our knowledge of the accentual system of Old Japanese, and attempt to show the series of changes that would be required to produce the major dialects of today. As part of this process, I will discuss the arguments for metrical structure in Japanese made by Poser (1990), Archangeli and Pulleyblank (1984), and others, and propose a role for such structure in prosodic change. Finally, I will take a short digression

into the little-studied history of Korean accent, which provides an interesting parallel to that of Japanese.⁶

The review of Japanese accentual dialects presented here is based on the facts given in McCawley (1968), Haraguchi (1977) and Martin (1987), of which the last is the most comprehensive. All Japanese dialects agree on having some use of tonal elements as prosodic markers within a phonological word, though some patterns are so minimally distinctive as to be better described as intonation rather than accent. Four basic groups of accentual systems are recognized. These are the Tokyo type, the Kyoto or Kansai type, the dialects of Western Kyushu, and a catch-all class which McCawley terms the accentless type. In this last type, accent is never distinctive, and pitch contours are always determined by phrasal or sentential bracketing. Still, these dialects will have some relevance for the overall comparison of accentual patterns. Let us review each dialect type in order.

The dialects of the Tokyo group are, in some ways, the simplest of the accented types. As mentioned in Chapter Two, one need know only which morphemes in a word are underlyingly accented in order to predict the pitch pattern of any phonological phrase. Only the first accent within a phrase is generally realized on the surface, though certain types of

⁶I will not attempt in this short discussion to enter the ongoing debate concerning the possible relationship, genetic or otherwise, between Japanese and Korean.

compound nouns are exceptions to this generalization (cf. the remarkably similar situation in Vedic in Chapter Four). Some amount of morphologically-trigger accent shifting occurs in derived forms, but these details need not be discussed here. In extended phonological phrases, those built up of shorter phrases, each sub-phrase may carry an accent, with downstep occurring after the first accent.

In nouns, the underlying placement of accent is free; surface accent may occur on any syllable in a nominal form. In verbs and adjectives (which form a single grammatical class in Japanese), accent placement is more restrictive. Roots are either accent on their penultimate syllable or not at all. Suffixes may be accented in a variety of patterns, as with the nominal suffixes.

Once the position of accent within the phrase is determined, separate rules within each dialect lead to the surface pitch pattern. In the Standard Tokyo dialect, the first syllable of a word is Low unless it bears the accent, in which case it is High. Following syllables are High until the pitch drops to Low immediately following the accented syllable. If the accent is on a long (bimoraic) vowel, the pitch always drops between the morae of that vowel, never after the second mora. Under these rules, an unaccented word will be Low on the first syllable and High on all others. A word with accent on the final syllable will be indistinguishable from an unaccented form unless an enclitic follows. In this case, the unaccented form will continue High

pitch onto the enclitic, while a form with final accent will drop to Low on the enclitic.

The other major dialects of the Tokyo group have the same underlying rules of accent, but show various realizations of accentual distinctions:

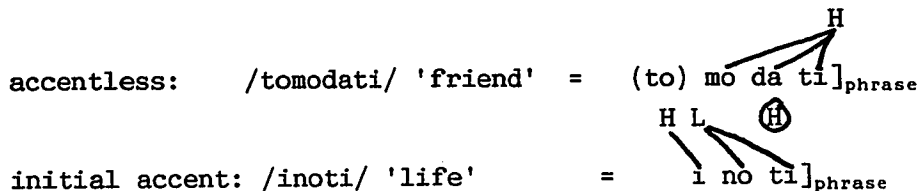
- a) Nagoya: basically identical with Tokyo, except the rise to High on the second syllable is gradual, beginning on the first syllable and ending at the very end of the second.
- b) Nakamura: High first syllable, then Low until the accented syllable, which is High; all following syllables are Low.
- c) Narada: same as Nakamura, except accented syllable is Low and following syllables are High.
- d) Akita: Accented syllable is High, all others are Low.

If we follow Haraguchi's description of such patterns using an autosegmental framework, we will need to make the following distinctions to correctly indicate the differences of the Tokyo-type dialects:

- a) What basic melody is associated with the lexical accent?
- b) What boundary tones, if any, are associated with the phonological phrase?
- c) Are there any extratonal elements?
- d) What rules control the spread of tonal elements?

So, in the standard dialect, we would mark the first syllable extratonal unless it itself has the accent; the lexical accent is associated with the melody H-L, with the High attached to the accented syllable itself; there is a default High tone on the right margin of the word; and tones spread in both directions. It is assumed that the extratonal first syllable receives a default Low tone after tonal spread

occurs.⁷ The pitch patterns found in Tokyo words will thus be described as in



other accent: /natu-yasumi/ 'summer vacation' =



Notice that the final boundary High only appears if the phrase is accentless; this can be accounted for by the same rule which deletes multiple accents within the phrase, leaving only the first. The assignment of the Low tone to initial syllables is not given here.

For the remaining Tokyo-type dialects, we would need to set similar parameters within an autosegmental model. In Nakamura, for example, the accent is identified with High tone, there is a High boundary tone on the left margin, there is no extratonicity, and tones do not spread in either direction. This will make the first syllable of a phrase High, the accented syllable High, and all others Low by

⁷The same result can be obtained by assuming a floating Low boundary tone at the left margin, and allowing it to associate with the first syllable before tone spread. However, it would be necessary to stipulate that this tone cannot spread, an ad hoc condition that makes the extratonicity argument the more acceptable solution.

default.⁸ Akita has a High melody on the accent, no boundary tones, and no spread or extratonicity. Narada can be analyzed in several ways; one is to take the Nakamura pattern, but associate the accent with a Low-High rather than High, and allow spread of tones in both directions.

These dialects thus serve as ideal examples of the most superficial type of prosodic change: the retention of the underlying system with the change of the accentual marker. The changes found in boundary tones and extratonicity, while more significant, are still minor compared to the changes one encounters in moving outside the dialect group.

In the dialects of the Kyoto type, is it not sufficient to know the place of the accent to predict the surface pitch patterns. One must also know whether the first syllable of a phrase is High or Low. McCawley (1968:192ff) accounts for this difference by assuming that all Kyoto phrases have a boundary High tone at the left margin; if a word begins Low, he assumes that the phrase has a "pre-accent" which drops the pitch exactly as the Tokyo accent does (see also Kindaichi (1951); Martin (1987:143ff) has doubts about this assumption). Kyoto appears to have the same High boundary tone on the right margin of the phrase as does Tokyo, which

⁸An alternative here is to assume two H-L melodies, one associated with the left margin, and one associated with the accent, with rightward spread of tones. This allows the basic melody of the accent to be the same in Tokyo and Nakamura, but would violate the "one High per phrase" rule which marks the Tokyo dialect as distinct from the Kyoto type.

appears on final syllables (but does not spread) if no other syllables in the word are High toned.

Without going into specific examples, the possible pitch patterns in Kyoto phrases are as follows. If a word has no pre-accent, it will be High toned until the accent, then Low; if there is no accent at all in the phrase, it will be High on all syllables. If the form has a pre-accent, it will be Low until the lexical accent, High on the accented syllable, and then Low again; if there is no accent within the phrase, it will be Low toned throughout until the final syllable, which will be High.⁹

Of great interest is the comparison between the placement of accent in Kyoto and Tokyo dialects. While not identical, there is a regular correspondence between the two types. The Tokyo forms can be derived from the Kyoto forms by moving all accents (including the pre-initial type) one syllable to the right. Previously final accents will be lost in this shift. Since Kyoto forms cannot be derived from Tokyo forms by the reverse procedure, it is clear that Kyoto represents the older state of affairs; we will discuss the implications of this below. It should also be mentioned that there are a few "intermediate" dialects between the Tokyo and Kyoto types; these have no pre-accented forms, but the position of the single lexical accent is in the unshifted

⁹Notice that the final High boundary tone is not deleted by the presence of the pre-accent; it is for this reason that I have phrased the rules concerning the appearance of the final High as tone-based rather than accent-based.

Kyoto position.

The dialects of Western Kyushu have divided all phrases into two basic melodies, termed "rising" and "falling". In Shuri and Fujitsu, for example, rising phrases are Low throughout, except that they "rise gently at the end, so that you clearly hear the juncture between two [rising] phrases" (Martin 1987:139). Falling phrases have High tone on the first mora of a word, and on the second as well, if it is neither the final mora of the phrase nor part of the same syllable as the first; all other syllables are Low. It would appear that these dialects make use exclusively of boundary tones. The same final High tone we have seen in the two other dialect groups appears here, but seems to act as a floating "intonational target" at the end of the phrase, rather than associating specifically with the final syllable. Falling phrases have an initial High tone as well, which associates with the first one or two mora of a word in an interesting manner; the conditions on this rule will come up in our discussion of metrical structure.

In Kagoshima, rising phrases are Low until the final syllable, which is High. This would appear to be a direct match with the rising pattern of Shuri and Fujitsu, with actual attachment of the floating tone. Falling phrases have a High tone on their penultimate syllable, and all else Low; monosyllables have a Falling contour tone. These forms as well will be discussed in terms of the metrical structure. Finally, in Nagasaki, rising phrases are as in Kagoshima,

while the falling pattern differs based on the number of syllables. Bisyllabic phrases have a High-Low pattern, while phrases with more than two syllables have a High second syllable, and the rest Low. I will argue that the patterns of these languages is directly related to the metrical structure of Japanese, and thus they properly belong to the "accentless" type, having no morphologically marked accents as such (though the rising and falling patterns still need to be indicated).

When compared to the first two accentual groups, there do appear to be some regular correspondences between the Western Kyushu forms and the Tokyo and Kyoto equivalents. Western Kyushu falling nouns generally have initial accent in their Kyoto cognates, while rising nouns do not. The following table, from McCawley (1968) gives a overview of these relationships, along with his reconstructed Proto-Japanese forms for these nouns. The Sapporo forms show another version of the basic Tokyo type of accent:

	Kagoshima	Kyoto	Tokyo	Sapporo	Proto-J.
1. 'plum'	ume	ume	ume	ume	*ume
2. 'cliff'	iwa	iwa	iwa	iwa	*iwa
3. 'leg'	asi	asi	asi	asi	**asi
4. 'sea'	umi	umi	umi	umi	*umi
5. 'autumn'	aki	aki	aki	aki	**aki*

Type (1) nouns exemplify the treatment of an unaccented morpheme in the various dialects. Type (2) shows a secondary accent in Kyoto and Tokyo that has apparently been lost in

the other dialects. Type (3) has regular accent on the first syllable in all cases, while type (4) reconstructs with only a pre-initial accent and type (5) has both pre-initial and final accents.

Finally, the so-called "accentless" dialects treat all phrases identically. In Miyakonojo, the final syllable of a phrase is always High, all others low; in Shimagawa, the initial syllable is always High. In Sendai, all syllables are High except the final. The first two types appear to involve boundary tones associating without spread, while Sendai appears to have either fixed a Tokyo-style accent on the penult, with spread of the High tone back, or has extratonal final syllables with the rightward spread of an initial boundary High tone.

Though faced with this bewildering array of surface pitch patterns, the common features of the underlying systems of the various dialects are still reconstructable. Besides the correspondence given above for the placement of accent in nouns, such features as the final High boundary tone and the limitation on one accent within the phrase itself are still universal. Another area of comparison has not been given adequate attention, however: the pitch patterns displayed in each dialect for atonic forms, and the conditions locating positions of pitch change in such "default" situations. Of course, in the accentless dialects and, to a certain extent, the Western Kyushu types, these default patterns are the norm.

If we pull out of the review of dialect features given above the specific treatment of atonic forms, we find a remarkable similarity:

- a) Tokyo--Low initial syllable, remainder High.
- b) Kyoto--High throughout.
- c) Shuri/Fujitsu--rising: High final, remainder Low.
falling: High initial 1-2 morae, remainder Low.
- d) Kagoshima--rising: same as above.
falling: High penult, remainder Low.
- e) Nagasaki--rising: same as above.
falling: High initial if 2 syllables; High second syllable if > 2 syllables, remainder Low.
- f) Miyakonojo--High final, remainder Low.
- g) Shinagawa--High initial, remainder Low.
- h) Sendai--Low final, remainder High.

To account for these accentless patterns within an autosegmental framework turns out to be relatively simple. The assumption of a non-spreading final High boundary tone accounts for pattern (f) and for the rising versions of (c), (d), and (e). If the final syllable of a phrase is extratonal, the same boundary tone will account for (g). If the boundary tone is allowed to spread leftward, final extratonicity will account for pattern (h), though there maybe reason to account for this through an initial tone, as in the following dialects.

Kyoto can be explained by a boundary High on either margin, but the complete accentual patterns of that dialect indicate that a left-margin boundary High is the best candidate; spread to the right must be assumed, of course.

Tokyo can be explained by the same tone, with the inclusion of initial extratonicity. Sendai involves the same tone with rightward spread and final extratonicity. The preference for this solution for Sendai is based on universals of directionality on tone spread which will be discussed in the next section. Shinagawa involves the simple assignment of the High to the initial syllable and no spread.

These are all of the patterns which can be described through the three features of boundary tones, spread, and extratonicity. This leaves the pattern found on Kagoshima falling phrases, the Nagasaki falling pattern, and the Shuri falling pattern to explain. Shuri and Nagasaki show some kind of alternation in involving the first two syllables. In Nagasaki, the first syllable appears to be extratonic only if more than one syllable follows; with this consideration, it can be explained by the initial High tone and lack of spread. In Shuri, after the assumed association of the initial High tone to the first mora, an extremely limited form of spread occurs, only off of a monomoraic syllable to a following non-final syllable. The default pattern in Kagoshima could be explained by reference to extratonicity, except for the Falling contour found on monosyllables. This indicates that the penultimate High found in longer forms is not caused by extratonicity, but results from the association of a High-Low melody with the last two syllables of a phrase (compare the Falling contour found on bisyllabic forms with final syllable accent in Kyoto).

The results of this comparison show that, in atonic forms, the only areas of the phrase which require special attention are the first two and last two syllables. In most of these dialects, one must indicate possible extratonicity on the first or last syllable, while in others one must know if the phrase is longer than two syllables (Nagasaki and Shuri); in one dialect, there appears to be a special tonal assignment rule over the last two syllables (Kagoshima). It is interesting to note that Kyoto, which is in many ways the most accentually conservative dialect, shows none of these special considerations, and simply spreads an initial High tone through the entire phrase.

Processes involving the special treatment of two adjacent syllables or morae at the margins of a phonological phrase should be starting to look familiar by now. Given what we have already said concerning the effect of metrical prominence on tone association (along with the further parallels in the next section of this chapter), it would be desirable to be able to account for the patterns found here by positing a single metrical foot at one end or the other of the phrase in the various dialects. Let us take a moment to see what metrical structures and rules would be involved.

In the falling phrases of Kagoshima, we would construct a binary metrical foot, left-headed, at the right margin of the word. It would appear that the prominence assigned to the penult in polysyllabic forms acts as the position for a High-Low accent melody, as is found in the Falling contour of

the monosyllabic words of this pattern. This instance of fixed pitch accent is relatively unusual, though it does contrast with the rising forms in the same dialect. The situation in Sendai involves the blocking of the spread of the initial High past the penult of the phrase. The easiest explanation is the development of final extratonicity as a reaction to predictable metrical weakness, as we have already discussed in Chapter Two.

On the left margin of the word, Tokyo would appear to be a mirror image of Sendai, with the initial syllable extratonic due to the influence of a right-headed binary metrical foot on the left margin of the word. In Nagasaki, we have what appears to be the same situation, but with the extra condition that extratonicity only occurs in words of more than two syllables. While there are a number of possible constraints on metrical structure rules that would produce this result, one suggestion is that Nagasaki phrases contain both metrical feet under discussion, so that first and last syllables are both extratonic. This would have no effect on the normal association of the initial boundary High except in bisyllabic words. Here, the building of the two feet would collide, leaving both syllables of the word extratonic. This runs afoul of an apparently universal constraint which blocks the application of extrametricality and related processes if they would leave no element of the phonological domain in the structure being built. Thus, we might assume that in bisyllabic forms, only final

extratonicity applies, leaving the initial High free to associate with the initial syllable.

Things are considerably simpler in the dialect of Shuri and Fujitsu, where the initial High associates with the initial mora in all cases. Here, however, we apparently have a case of the spread of tone from the weak to the strong position within a metrical foot (cf. Haya in the next section for a perfect mirror image example of this). Notice, however, that the metrical foot in this case takes syllable weight into account, since if the first syllable of the phrase is bimoraic, High pitch does not spread. Spread is also blocked in bisyllabic forms, identically to Nagasaki, possibly indicating the existence of a final foot here as well.

Thus, the assumption of two metrical feet within Japanese phonology, one at each margin of a phrase, of which neither, one, or both may be present in any given dialect, helps to account for certain irregularities in the attested accentual patterns. Notice that these posited metrical feet will interact with morphologically assigned accent only in the case of the Tokyo dialect, and inherent accent appears to override metrical prominence in this case as expected.

If we were to attempt to derive the two marginal feet found in Japanese from some type of iterating structure, as was done in the example of Celtic, we would immediately run into a problem. Unlike the feet of Welsh and Irish, the two feet posited here are oppositely headed, and thus cannot be

straightforwardly derived from a single iterating rule. It is unclear at this point if any more can be said insofar as the possible origin or development of such metrical structures.

Is there any evidence for the existence of these proposed feet other than the facts of accentuation? There does, at least for the foot at the left margin of the word. Poser (1990) has accounted for a number of accentual and non-accentual rules of Japanese phonology by assuming the existence of a bimoraic initial foot in words. Unlike the basically bimoraic foot I would suggest for Shuri, however, this foot can be built over the two morae of a single syllable. The proposed foot is relevant for such processes as hypocoristic formation, kinship terms, various types of nicknames, rustic girls' names, reduplication, etc. There is also a pattern of accentuation involving nominal compounds in which the placement of accent varies on the length of the final member. The crucial distinction is between words of two morae or less (one foot) and longer forms. What is interesting is that Poser mentions a contradiction in the directionality of foot construction between many types of examples. Some types appear to involve right to left construction, while others involve left to right construction (though in no case is more than one crucial foot involved in any of these processes). Thus, Poser's data seems to concur with the "foot at each margin" proposed here.

More problematic is the fact that Poser's study

definitely finds a bimoraic rather than a bisyllabic foot. The accentual rules appear to be built around feet sensitive to syllables. This difference is more apparent than real, however, because of the relationship between syllables and morae in Japanese. As a number of researchers have pointed out (e.g. McCawley 1968), the accent of Japanese, like that of Greek, is sensitive to morae but is assigned syllabically. In the case of the accentual use of metrical structure, I would argue that the the moraic foot was reanalyzed in syllabic terms to conform to the syllabic accent assignment rules. Thus, while a bimoraic foot can consist of one or two syllables, the accentual rules regularized the two-syllable version. The foot proposed for the Shuri dialect may still maintain some of the older moraic sensitivity.

Since the conservative Kyoto dialect does not show any signs of such metrical interference in accent assignment, it probably represents the older stage of Japanese accentual history. The maintenance of two possible accents in this dialect, rather than the one of the Tokyo group or the zero of some of the other dialects may also represent a survival of an older state of affairs, as a comparison of the modern language with the older texts can verify.

The following discussion of Old Japanese is necessarily abstract, due to the spotty nature of our knowledge of the system used to record pitch patterns in the eleventh century texts. The diacritic would appear to be straightforward (a

dot in the upper left of a syllabic character for High pitch, and a lower left-hand dot for Low pitch), but even this much of the system has been challenged.

Hayata (1973) discusses a large number of forms found in the Ruijomyogisho, a set of poems collected about 1100 AD. Since the pitch of each syllable is marked independently, a wide variety of possible pitch contours can be recorded. In addition it is possible to indicate contours within syllables, which were apparently quite common. Examples given here are typical:

<u>kuti</u> 'mouth'	<u>isi</u> 'stone'	<u>mizo</u> 'ditch'
<u>pana</u> 'flower'	<u>pagi</u> 'leg'	<u>ame</u> 'rain'
<u>yuri</u> 'lily'	<u>matu</u> 'pine tree'	

Note that many of these pitch patterns would be impossible in any of the dialects of the modern language, the all low melody of /pana/ being a good example. If we represent these examples with tone letters instead of contour lines, the resulting patterns are

H ^ kuti	H L isi	H L N mizo	L H V yuri	L H matu
L ^ pana	LH L V pagi	L HL V ame		

We thus have almost every possible tonal combination of the elements High and Low on both positions of these bisyllabic words. While Haraguchi (1979) argues for a complex pitch-accent analysis here, the arguments seem strained. He must posit three basic melodies to account for

the attested patterns: HL, LHL, and LH. The position of the High tone of the melody is then determined by a diacritic accent within the word. This process can lead to some rather strange results.

In order to make this system work, Haraguchi must assume that in unaccented forms, only the first tone unit in the pre-assigned melody associates with the word. In /kuti/, which he assumes is unaccented and carries the High-Low melody, this makes both syllables High. Likewise, in /pana/, only the Low tone of the LH melody associates, yielding the Low-Low pattern. But this is contrary, it would seem, to some of the basic assumptions of autosegmental theory, which generally assumes that all tones available in the melody are associated, as long as there are available tone-bearing units for them. Goldsmith (1990:14) gives his association convention as

When unassociated vowels and tones appear on the same side of an association line, they will be automatically associated in a one-to-one fashion, radiating outward from the association line.

In cases such as this, in which no pre-associated elements exist to create an association line, the same procedure applies starting at the relevant word margin. Thus, if /pana/ bore a Low-High melody, general convention would lead us to expect a surface Low-High pattern. An accent can be used to override the standard procedure, but Haraguchi uses accents to trigger the standard procedure.

A second problem with this interpretation of the Old

Japanese data has to do with the number of Basic Tone melodies used in the analysis. As I have argued in Chapter Two, one of the best working definitions of pitch accent is a system in which a single predictable melody is the marker of lexical accent. Haraguchi is more flexible; he has argued (1977) that the Kansai dialects have two tonal melodies, LH and HL. Even he admits, however, that Old Kyoto is the only known language with three tonal melodies. This makes the proposed analysis less convincing than it might otherwise be.

Finally, there are forms in the Old Kyoto texts that simply do not work under Haraguchi's analysis. An example is /nizi/ 'rainbow', with a High-Low pattern. No underlying accent assignment will yield this association of tones to syllables; all of the available High-Low melody patterns have already been used. Thus, it would appear that the attempt to reduce the Old Kyoto system to a pitch accent, similar to the modern dialects, must be rejected, and Clark's assertion that "the Japanese of that period had the typical nominal tone melodies of an unrestricted tone languages, including virtually every possible combination of H and L", specifically rejected by Haraguchi (1988:129) is, in fact, correct.

If this is indeed the case, we can see the history of Japanese accent as a process of various dialects restricting the inherited tone system in a range of related ways. The primary change has been the establishment on unknown principles, of a set of inherent pitch markers within the

Tokyo and Kyoto systems, and the reduction of tonal contrast points within the phonological phrase. In the modern systems, instead of individual tonal assignments on each syllable, the pitch may change only at the margins of words, at accented syllables, and, most interestingly, in set syllables apparently indicated by metrical prominence points. As in a number of our other studies, Japanese provides evidence for prosodic change occurring through the interaction of the subsystems of the overall prosodic system.

If we turn for a moment to the data available of the history of Korean accent, certain similarities to the situation in Japanese immediately become apparent. Chang (1978) has compared the pitch accent system found in Middle Korean texts with the patterns in the two modern dialects which preserve pitch distinctions. In one of these two, South Hankyeung, the rules governing the realization of accent are identical with those of standard Tokyo Japanese: low first syllable if unaccented, then High until the accented syllable, then Low again. There is no more than one accent per phonological phrase, and no pre-accented roots.

The second dialect, Kyungsang, has no accents on the final syllables of polysyllabic roots; instead, it has pre-accented forms. If a pre-accented morpheme is word initial, it has High pitch on its first two syllables, followed by Low on the remaining syllables. This dialect is a closer parallel to the Kyoto type of Japanese, having accents one syllable to the left of the South Hankyeung dialect.

The modern dialects, then, are typologically very similar to the major Japanese patterns. In Middle Korean, we find a considerably different system. Accent interacted with vowel length; all long vowels were accented, along with some short vowels. On a long vowel, accent was realized as a rising tone, and on a short vowel as a high tone. An underlying accent deleted only an immediately following accent, not all following accents in a word. In addition, some suffixes were optionally de-accenting, deleting immediately preceding accent.

The result of these differences between the older and younger systems is to make the Middle Korean pitch patterns much more varied than the modern ones. Pitch could rise and fall several times within a phonological phrase, which would be impossible in the modern dialects. In fact, Middle Korean had a pitch lowering rule which applied to break up strings of three or more High-toned syllables:

$$H > L / H _ H$$

[-accent]

with the rule applying iteratively from right to left. This type of rule is common in tonal languages, but is not as expected in pitch accent systems.

Further evidence for Middle Korean having been more tonal than the modern language comes from the predictability of root tonality from syllable structure. Chang then presents a study of 215 verbal roots broken down by the structure of their final syllables. Significantly, those roots ending in a vowel or nasal are always accented; those

ending in a leniting obstruent (which indicates the historical loss of a sonorant) or a lateral are overwhelmingly accented; and those ending in an obstruent or a consonant cluster are overwhelmingly unaccented. Such a development of tonal distinctions from consonantal influence is the most widely accepted source of tonogenesis (Hombert 1975). I would suggest that Middle Korean, like Old Kyoto Japanese, is on the border between the typological categories of tone and pitch accent. In Korean, changes in the vowel system, especially the loss of length as a distinctive feature in some environments, may have led to the lexicalization of certain tonal patterns in the form of pitch accents. As the system matured, it lost the limitations against High-toned sequences, and maintained only one accent per phrase.

In Japanese, no such vocalic restructuring took place; the origins of the pitch accent rules cannot be seen as a breakdown of tone placement due to segmental effects (though segmental loss may have contributed to the rise of the original, more tonal system). Instead, the minimal metrical structure found in the current Japanese dialects may have played a role in re-focussing and limiting the older system, as we have seen above.

This pattern of tones associating with metrical structure will be observed further in the examples drawn from Bantu in the third section of this chapter, many of them quite parallel to the Japanese case. Heiltsuq, as discussed

in the previous chapter, has some important differences. If, as suggested there, Heiltsuq pitch accent arose from a bonding of intonational elements onto positions of metrical prominence, it would be an example of such association from "one level higher" on the prosodic hierarchy. Japanese and, as we shall see, the various Bantu languages, involve a more direct alteration in the prosodic organization.

6.3 Some metrical processes in Bantu

Common Bantu is generally reconstructed with a two-tone system, High and Low, and there is evidence for the existence of a fixed penultimate stress as well. Stress in this position survives along with tone in a number of Bantu languages, including Shona and Tswana. In other languages, stress as a surface feature has disappeared, but tonal perturbations and segmental rules both make reference to the penultimate syllable. In Swahili, distinctive tone has been lost while penultimate stress remains.

Tone placement in Common Bantu appears to have been relatively free, with few constraints on the number or types of tone found in a word. The tonal and stress systems appear to have been originally independent of each other. While the coexistence of two such prosodic subsystems is common, it appears difficult for speakers to keep the two types of prominence distinct. One of the systems regularly becomes dependent on or restricted by the other. Such changes have occurred in a number of Bantu languages.

A relatively minor development of this kind has taken

place in Chagga, a language spoken on the slopes of Mount Kilimanjaro in northern Tanzania.¹⁰ While stress is no longer realized on the surface as increased duration or loudness, high tones in penultimate syllables are noticeably higher than in other positions. This would indicate the continued survival, in a transformed way, of the metrical prominence assigned to that position in earlier stages of the language.

An interesting rule of syncope lends further support to the idea of a metrical prominence based on the old Bantu stress in Chagga. In certain forms, the vowel /i/ is dropped, but never in the final two syllables of a word. For example, in nouns belonging to the i-/ma- class, that is, nouns which have the prefix i- in the singular and ma- in the plural, the singular marker is absent in many forms: mariko, 'stoves', but riko 'stove' rather than *iriko; mayewo 'teeth', with either iyewo or yewo in the singular; similarly jima 'liver' has majima in the plural, and jejo 'word' has majejo. In pronominal and locative forms we find sets such as i-ha 'here', i-ho 'there' but halya 'over there', *ihalya ku-nu 'this place' < i-ku-nu, i-pfo 'that place'¹¹ ku-lya 'that place over there' < i-ku-lya

¹⁰I am grateful for the data on Chagga provided by Willie Makundi and Lioba Moshi, on which this section is based.

¹¹This form is the result of a rule changing k^wo > pfo, so that i-ku-o > ipfo.

i-tsi 'this one', i-tso 'that one', but tsilya 'that one
over there' < i-tsi-lya

In all cases, the prefix /i-/ is dropped only when it does not occur in the final two syllables.

The easiest way to describe this rule is to posit a final binary foot in Chagga, the assumed continuance of the foot underlying the older penultimate accent. We can then state the rule of /i/-syncope as "/i/ is eligible for syncope outside the metrical foot". This would make the situation in Chagga the mirror image of the rule we suggested for a similar syncope pattern in Nitinat in Chapter Five. In this way, the prosodic system of Common Bantu is still relevant in Chagga, even though direct surface realization of the older stress accent itself has disappeared.

A more thorough-going change involving the increased dependence of the tonal system on metrical structure can be found in Runyankore, a language of southern Uganda described in Johnson (1976). Runyankore has a dialect split along social class lines, with each dialect having a different prosodic system. High Runyankore preserves the use of tonal distinctions, but with an extremely restricted distribution. High and Falling tones may only appear in the penultimate syllable. This allows for no more than a three-way distinction in the tone pattern of any given form in this

dialect.¹² The only exceptions are some foreign loan words with antepenultimate high or falling tones. This restriction is especially interesting since, like Chagga, High Runyankore has lost perceivable stress.

In Low Runyankore, tone has disappeared altogether, while the inherited penultimate stress is preserved. These two dialects can be seen as representing two stages in the gradual process of the loss of tonal distinctions in favor of a simple stress accent. Swahili, which has a system identical to that of Low Runyankore, might serve as evidence for a sociolinguistic cause for such a change, since its use as a lingua franca throughout much of East Africa has led to a number of simplifications in its phonological and morphological systems. Certainly, fixed stress or pitch accent would be easier for second language learners to assimilate than a full tone system. While this argument would not account for the loss of tones in Low Runyankore, we may still argue that the broader use of this dialect vis a vis the more exclusive High form would increase the pressure to simplify the prosodic inventory.

¹²Can such a system be considered pitch accent? If we keep to our working idea that pitch accent always involves the mapping of a single melody to the prominent element, the answer is no. Such examples show just how grey the boundaries between restricted tone and some types of pitch accent can be. Notice, however, that if these tonal distinctions were lost and, say, High tone was regularized, High Runyankore would be a member of the small group of fixed pitch accent systems; it is likely that such a change would simply collapse into a stress system such as that found in the Low dialect.

Another type of change which shows the effect of stress on tone is found in Haya, another language of northern Tanzania. Here, the last two syllables of a word show a special type of tone spread. Specifically, the following two changes are recorded by Byarushengo, Hyman, and Tennenbaum (1976):

- 1) $H > F / _ L \ ||$ (phrase boundary)
 ex. /omukóno/ 'hand' > [omukôno]
 /omwáána/ 'child' > [omwâana]
- 2) $LH > HL / _ \ ||$
 ex. /omutí/ 'tree' > [omúti]
 /obugoló/ 'snuff' > [obugólo]

The tone switch seen in rule (2) is explained by a rule of final lowering in Haya. Thus, rule (2) does not actually involve a transposition of tones, but simply a leftward spread of the High tone, followed by the lowering of the tone in the final syllable.

In autosegmental terms, these rules would be depicted as

- 1) $\begin{array}{c} H \quad L \\ | \quad | \\ \text{---} \text{---} \\ V \quad V \end{array}]_{\text{phrase}}$ 2) $\begin{array}{c} L \quad H \\ | \quad | \\ \text{---} \text{---} \\ V \quad V \end{array}]_{\text{phrase}}$

Notice that in rule (1), both the High and the Low tones are associated with the penultimate vowel, creating the Falling contour. This is in fact the only position in which Falling tone is found in Haya. In rule (2), we would expect a Rising contour tone as the result of the spread, by analogy with rule (1). However, Haya does not have Rising tones at all; typologically, Rising tones are much rarer than Falling

contours. Thus, we must assume that the association of the first vowel with the Low tone is broken by some type of well-formedness condition, leaving a pure High tone on that syllable.

This account deals with the facts in a straightforward way, but it is typologically unusual. As Hyman and Schuh (1974) pointed out in their study of tone languages, leftward tone spread "is impossible (or at least very rare)". If this analysis of Haya with such spread is correct, can we find a motivation for such an unusual pattern?

Our answer can be based on the process seen in Slavic involving a move of prominence features from the weak to the strong position within a foot. In this case, let us assume the survival, in an abstract form, of the same Bantu stress foot which we posited for Runyankore. The leftward spread of Haya tone can then be explained as an alignment of tonal prominence with metrical prominence



The second case is the more direct. Since High tone is generally more prominent than Low tone, the spread to the strong position is expected. The leftward spread of Low tone is not as obviously tied to the metrical pattern, as the forms in which this rule applies already appear to have the proper match of tonal and metrical prominence. Aside from the general push for features to move from weak to strong positions, it can be argued that contour pitches can be seen

as more salient than simple High tones, which might also provide a motivating factor for such tonal spread.

This historical trend to eliminate clash between the metrical and tonal systems has been presented in Chapter Two as a possible origin for pitch accent. Nowhere is this more clear than in other members of the Bantu family, as discussed by Goldsmith (1987). Especially interesting in this regard is Tandu (or KiTandu), which belongs to the Congo sub-family of Bantu. I present here a summary of some of the facts of nominal accentuation.

Tandu nouns fall into four major tonal groups, and membership in any particular group is not predictable on phonological grounds. All nouns can then appear in any of four tonal cases, which are variations on the inherent tone patterns used as morphological markers of syntactic function. In tonal case 1, for example, the four tone groups show the following patterns:

TG 1	TG 2	TG 3	TG 4
ma-solokoto	ki-butukúlu	ma-fwatabála	ki-tundibilá
ki-nwaaninu	ki-taanínu	ma-kaakíla	ba-teekoló
ki-menina	ma-kyeléka	ki-kalála	ki-kokilá
ma-biibi	ki-wíina	ki-tuutú	n-tuutú
ma-lafu	lu-ngwéni	ma-tutí	ma-kukú

The separated prefixes show the class of each noun within the Bantu nominal classification system, which has no relationship to tonal group membership. Tone group 1

contains nouns with no underlying accent. Tone group 2 nouns have regular accent on their penultimate syllables (with the tone pattern H-L associated with the accented syllable), while tone group 3 nouns have an alternating pattern. If the noun stem contains one or two syllables, the form is accented on the final syllable; longer words have penultimate accent. Finally, tone group 4 nouns have regular final accent.

Goldsmith accounts for these differences by first assuming a rule of extratonicity for some final syllables. Thus, in TG 2 nouns all have extratonic ultimas; TG 3 has final extratonicity only if at least two syllables precede the ultima, and TG 4 never has extratonicity. With these adjustments, the rule for accent placement can be stated simply: Accent the last syllable of the stem.

The other tone classes alter these basic tone patterns in various ways, which need not be discussed in detail here. Goldsmith goes on to revise his system of rules for Tandu within a metrical model. He constructs a metrical hierarchy over the syllables of the noun stem, and suggests that "accent" can be redefined as "the most prominent element in the metrical structure". This approach, while presented from a purely synchronic viewpoint, has some interesting implications for the study of diachronic processes in Bantu.

First, we can see the same shift of tone away from the final syllable occurring in Tandu that we saw earlier in Haya. The "extratonicity" of the final syllable can be seen as a synchronic reflex of the predicted weakness of the final

syllable under the Bantu stress foot. Even more interestingly, the extratonicity rule takes effect in some types of nouns (TG 3) only if two syllables precede the ultima. In metrical terms, there must be a second full binary foot constructed before the penult in order for the final syllable to be extratonic. The details of the reason for such a restriction are unclear, though parallel "minimum length" rules in Italic and Japanese seem to point to potential clash in metrical foot construction in short domains as a possible motivation.

Second, since a metrical structure is needed for the determination of pitch-accent under Goldsmith's analysis, we have a good example of the rise of pitch accent through the hybridization of stress and tone as discussed in Chapter Two. If this process should run to its logical conclusion, tone will lose all function except as a marker of accent, as it has in Tandu. One last change that needs to be discussed is the development of tonal melodies that act as units in an autosegmental description. As mentioned above, Common Bantu is assumed to have had marked tone for each syllable in the lexical entries of words. However, in some Bantu languages, we find tones determined by morphological or grammatical class; since the number of syllables of the members of these classes may vary, the patterns of tonal association will also vary.

To summarize the kinds of data we have examined in Bantu, we have seen a number of different ways in which the

inherited tone and stress systems have interacted in a variety of modern languages. In general, the tone patterns have adapted to the metrical prominence relationships which appear to have been the basis for stress assignment. Tones have shifted to "accented" positions, or pitch has risen under the influence of metrical prominence. In some cases, the penult is now the only locus for pitch distinctions. All of these changes have taken place even in cases in which the phonetic realization of stress has entirely disappeared, arguing for the abstract survival of prominence.

A number of the Bantu examples are parallel to the situations described for other language families earlier. In addition to the analogous developments we have already mentioned, the rise of pitch accent in Tandu appears to mirror the Japanese situation in many ways, and is also similar to the Heiltsuq case. High Runyankore resembles some of the dialects of Serbo-Croatian in which pitch distinctions are still fairly broad, but limited to only one or two syllables of a word. And the split between the Runyankore dialects is an interesting comparison to Wakashan as a whole, where related stress and pitch accent systems coexist.

6.4 Conclusions

If one takes the case studies presented in the last four chapters all together, two observations at once present themselves. The first is the variety of prosodic systems encountered, and the scope of the changes which have occurred between those systems. Equally clear, however, is the large

number of parallel developments, mirror-image identifications, and other similarities that we have seen in widely dispersed language families and over long stretches of time.

That such a wide diversity of data should display such striking resemblances is in itself a strong support for the theoretical framework employed here. But we are still left with the need for answers to the major questions raised at the beginning of this study. Let me address them briefly here.

Our first concern was with the study of diachronic prosody as a subdivision of general historical change. It would appear that such a study can in fact be done, and produce worthwhile results. The fear raised that prosodic elements would be too dependent on general segmental changes to be studied profitably in themselves has, I believe, been shown to be incorrect. Enough direct changes within a formal model of prosody have been observed so that the nature of these changes can be described without relying on segmental processes at every turn.

Our second question concerned the value of metrical and autosegmental theory as tools for understanding prosodic change. This is a much larger and more theory-intensive question, and should be reviewed carefully at this point. It is clear that we have been able to describe many of the changes which we have encountered in the terminology of these theories, invoking such phrases as "floating vowel",

"metrical foot", "extrametricality" and so on. In addition, the application of some of the ideas of autosegmental morphology has also been useful in the discussion of such matters as Latin vowel reduction and the status of schwa in Kwakiutlan. The usability of terms, however, should not be confused with explanatory power. We must ask what gains in overall generalization we have made through the application of these theories.

I believe that such gains have in fact been made, in a number of areas. First, the separation of the tonal features within a prosodic system from the rhythmic or "stress-like" metrical features has made several types of change easier to understand. As long as pitch-accent, for example, was viewed as a single element or even a vocalic feature, its interaction with stress and tone was difficult to describe. Too often, under such a view, languages such as Vedic or Japanese on one hand, and KiTandu on the other, would all be lumped together as "pitch-accent" languages, despite important differences between them. If instead we are able to divide pitch accent into metrical and inherent pitch accent, we are in a position to make many of the distinctions necessary for a better understanding of diachronic change. As a hybrid of many of the features found in tone and stress languages, pitch accent is especially liable to be an intermediary in prosodic change.

We are also able to clearly describe the difference in organization between a Japanese type of accent, based on

underlying features of morphemes, and many of the African types where the position of accent is determined by metrical rules. The evolution of a system such as that found in Heiltsuq would be much more difficult to describe if we could not discuss metrical accents serving as the docking positions for tonal elements.

The models also help in our description of the typologically expected features in each category of prosodic system, which can sometimes serve as a clue into the history of a given language's accentual developments. The fact that tones are expected to spread to adjacent elements, while stress is more likely to alternate, is captured within the basic formalisms of the two theories. As we have seen, this difference leads us to examine the "spread" of Russian stress, i.e. the limitation of vowel reduction in pre-tonic syllables, as a possible indicator of earlier pitch-accent in Russian. And, in fact, we saw how the interaction of the earlier Slavic pitch accent with the metrical structures of Russia made this relatively unusual type of spread understandable.

Perhaps the most interesting contribution on the metrical side of things has been the concept of the metrical foot. In general, the foot has been employed in this study with about the same frequency as the syllable. And, in many important ways, the two organizational structures are similar. Both are hard to capture by purely mechanical investigation, yet seem to be quite real to speakers. Both make use of similar

ideas of length and weight, and the syllable generally plays a role in the determination of foot structure. The metrical foot appears to function in many ways as a kind of suprasyllable, the next step up the ladder of phonological organization. Without it, many of the comments made in our descriptions of Nootka, Russian, Italic and Japanese would be arbitrary at best, and impossible at worst.

The idea of extrametricality, while certainly useful in several of our discussions, appears to be more of an artifact of historical developments than a basic principle of prosodic organization. The wide varieties of its formulation, and the range of rules which make reference to it, indicate that we are dealing with a phonological status which may arise in a number of ways, apply at a number of levels within a phonological process, and generally must be treated as a cover term for a variety of fossilizations of historical weakness.

Perhaps the most important contribution of both of these theories is the idea of systematic assignment of stress and tone. The concept of a stress structure, which did not originate with metrical theory, has been emphasized by the terminology employed therein. We need only compare the more traditional descriptions of the accent system of Latin or Greek with the way such systems have been described here, to see that the metrical version allows us to account for change in a much more rigorous way.

Thus, I conclude that metrical and autosegmental

theories do contribute in meaningful ways to our understanding of prosodic change. At the same time, the examination of diachronic data has pointed out some of the flaws and gaps in the current versions of both theories. On the metrical side, we have already discussed the problems with extrametricality. There is also the problem seen in distinguishing what Hammond termed parsing feet from stress feet, that is, the use of metrical structure for syllable counting or for the division of prosodic domains rather than stress assignment. This distinction is crucial for such developments as the Slavic jer-shift, but is not widely recognized in the literature.

Things are more straightforward when dealing with autosegmental tone assignment, but there are still problems. The issue of the status of diacritic accent remains important both synchronically and diachronically. Let us take Japanese as an example. How shall we capture the accent deletion process seen in the Standard Tokyo dialect and others? We have two choices. We may make use of a diacritic accent, to which a High-Low melody is later attached, and make the rule operate on the diacritics (Haraguchi 1988), or we may have the High-Low sequence pre-attached in the lexical description of some morphemes (Archangeli and Pulleyblank 1984). Other things being equal, Occam's razor would lead us to choose the pre-association theory, since it eliminates what appears to be a redundant step in the description of tone patterns. However, Haraguchi (1988:138ff) goes on to present some forms

from the Kagoshima dialect which appear to show a distinction between High tones mapped onto accented syllables and those mapped onto unaccented syllables in regard to downstep. Middle Korean also distinguished accented and unaccented High tones, and the view of Vedic accentuation given here also makes crucial use of diacritic accent. If these examples are correct, we are left with saying that such diacritics may have a role in our understanding of prosodic change.

Despite these problems and uncertainties, I believe that the model of prosodic organization presented here is a useful one for diachronic studies. While I have concentrated on establishing a formal descriptive framework for the discussion of change, the issue of the motivation for such change has come up at several points. A few general statements supported by the case studies will act as a summary here.

The general process of simplification of iterating to non-iterating rules has been the focus of our discussion. This trend towards eliminating clash between prominence based on tonal assignment and prominence based on metrical rules can also be seen as a move towards simplification of the prosodic system. In such cases as Bantu or the early stages of Slavic, it apparently became impossible to maintain two independent systems, with the result being a linking of the two.

The idea of prominence ties this approach to the issue of simplification. If our theories of phonology make no

general statement about the role of prominences within the organization of prosodic systems, there is no reason that the stress features and tonal features of a language should necessarily interact, let alone that such interaction could be viewed as simplification. Only if we see both subsystems as competing elements, along with quantity, etc. in a contest for the marking of relevant prominence within a domain do the arguments made through these case studies make sense.

In the course of this thesis, I have had to describe what were often highly complex prosodic inventories, systems, and rules in the briefest possible terms, and have often pulled one or two details from an entire language while ignoring the richness of prosodic data available. Since the goal of the present work is simply the outlining of some general principles of prosodic change, such selectivity may be justified. It is hoped, however, that further investigation into many of the cases of prosodic evolution mentioned here will be able to establish the facts and changes involved with a greater degree of depth and analysis. I also hope that the tentative ideas put forward here will encourage further investigations into the motivations, mechanisms, and typological patterns of prosodic change.

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