

THE UNIVERSITY OF MANITOBA

ASPECTS OF KITSAI PHONOLOGY

by

JOHN LIESSMAN VANTINE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

DEPARTMENT OF ANTHROPOLOGY

WINNIPEG, MANITOBA

April 1980

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A thesis submitted to the Faculty of Graduate Studies of
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ABSTRACT

An attempt is made to construct a partial synchronic phonological description of Kitsai, an extinct North American Indian language of the Caddoan family. The language is primarily attested in a corpus of narrative texts elicited by Alexander Lesser from the last native speaker in the summers of 1929 and 1930. The present study is based on philological analysis of four of these texts which were published by Douglas R. Parks in Caddoan Texts (1977) International Journal of American Linguistics, Native American Texts Series, 2(1). Chicago: The University of Chicago Press. and is undertaken within the theoretical framework of generative transformational grammar. A number of phonological rules are formulated to account for various phonological processes, most of which pertain to consonants.

Evidence is presented to argue for a monosegmental representation of the affricate; it is argued that textually-attested aspiration and palatalization represent vowel devoicing; evidence is presented in favor of positing a four-vowel system for the language, and of a vowel lowering rule; an account is given of several alternations of the resonant segments; an attempt is made to indicate the evidence for a surface structure constraint on geminate obstruent clusters which is satisfied by various deletion rules; a sketch is presented of the morphology and phonology of prefixation and suffixation in the Evidential. The present study represents the second piece of work on the Kitsai language.

ACKNOWLEDGEMENTS

A number of people have assisted in bringing this thesis project to completion, and I want to acknowledge here their generous contributions of time and resources.

Of the members of the Graduate Committee at the University of Manitoba, I especially wish to thank the Chairman, Dr. Richard T. Carter, Jr., Dr. John Haiman, and Dr. H. Christoph Wolfart, all of the Department of Anthropology for their helpful criticism, sustained interest, and often much-needed encouragement throughout the preparation and writing of this thesis. Dr. Carter has particularly (but cheerfully) paid the price of his attentive supervision, and has shown remarkable patience with an exasperatingly drawn-out project. I am deeply indebted to both Dr. Carter and Dr. Wolfart for several years of inspired teaching in linguistics generally, and in Siouan and Algonquian in particular. I have learned from them much more than they know. I am also pleased that Dr. Haiman arrived in the Department in time to serve on the Committee, and I have learned much from him as well. In addition, I would like to thank Dr. Haraldur Bessason, of the Department of Icelandic, for serving as External Examiner.

I also wish especially to thank Dr. Douglas R. Parks, Director of the North Dakota Indian Language Project at Mary College, Bismarck, N. Dak., for sharing with Dr. Carter the responsibility for supervising this thesis, and also for serving as External Examiner. It was Dr. Parks who originally suggested that I work on Kitsai, and who made available the

Kitsai texts elicited by Alexander Lesser. Dr. Parks also served as Field Supervisor throughout the research and writing of this study, and I am deeply grateful for the many hours he devoted to my analytical problems. I owe much of my interest and knowledge of Caddoan languages to him.

I also extend my deep appreciation to Dr. Alexander Lesser of Hofstra University, New York. Dr. Lesser elicited the texts which form the basis for this study, and was therefore uniquely able to offer suggestions which clarified some aspects of textual analysis.

I have also greatly benefited from the numerous helpful suggestions and the encouragement offered by Dr. Robert C. Hollow, Jr., and Dr. A. Wesley Jones, of the State Historical Society of North Dakota, and of Mary College, Bismarck, N. Dak., respectively. In addition, Dr. John Crawford of the University of North Dakota, and Dr. Philip Greenfeld of San Diego University, California, provided useful comments and I thank them. In view of the sound advice received with respect to this thesis, it is especially necessary to claim personal responsibility for the final result, which I cheerfully do herewith.

Superintendent James E. Sperry and Curator J. Norman Paulson of the State Historical Society of North Dakota arranged a brief leave of absence in early 1978, during which time much basic analysis was accomplished. Archaeologists Nick Franke and Jan Signe Snortland-Coles, also of the State Historical Society of N. Dak., and Dr. Gordon L. Bell, of Bismarck, provided technical assistance with the final draft.

Dr. Roger Kennedy, M.D., of Bismarck, N. Dak., generously provided a typewriter for the two major drafts of this study. Mrs. Holly Ryckman of Carrington, N. Dak., whose interest in American Indian languages is surpassed only by her skill, typed the difficult final draft. My deep appreciation is extended to both.

Finally, the value of the continued moral support offered so freely by my parents, Mr. and Mrs. Jack D. Vantine, and by my wife, Denise Conlin (Vantine), is impossible to measure adequately, and this thesis is dedicated to them, in gratitude.

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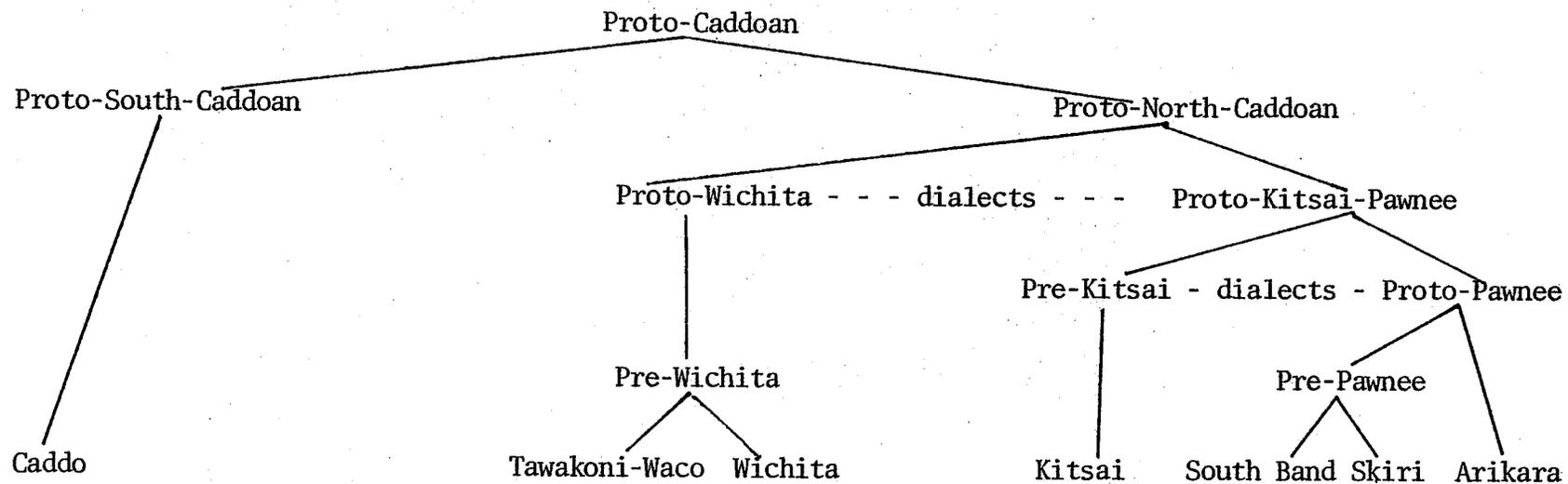
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1. INTRODUCTION

This study is an attempt to investigate and describe selected aspects of the phonological structure of Kitsai, an extinct American Indian language of the Caddoan family, which includes: Arikara; Caddo; Skiri and South Band Pawnee; and Wichita. The purpose of such an undertaking is twofold: to make some contribution to ongoing comparative studies of the Caddoan languages by providing a partial synchronic description of the phonology of a little-studied member of that family; and to present the results of a generative phonological analysis based on data obtained through philological study of the extant texts in the language. The description which follows thus represents both a partial synchronic phonology of an extinct Caddoan language, and an exercise in philological method.

Modern linguistic descriptions of the respective cognate languages are represented by Merlan (1976), Chafe (1976), Parks (1976) for both Skiri and South Band ; and Rood (1976).¹ Previous work on Kitsai is represented exclusively by Bucca and Lesser (1969).

The genetic relationship of Kitsai to the other Caddoan languages is shown in Figure 1.



Kitsai is a member of the Northern Caddoan sub-group of the Caddoan family. Lesser and Weltfish regard Kitsai as occupying an intermediate position between Wichita and Pawnee, and suggest that Kitsai most clearly resembles South Band Pawnee (Lesser and Weltfish 1932:1). However, it is the "distinct impression" of Parks, a more recent investigator, that Kitsai is "at least slightly more closely related to Pawnee...", and glottochronological comparisons tend to support this view (Parks 1979:10). Parks also gives impressionistic dates for the separations of the Northern Caddoan languages, from which the following have been selected as pertinent here.

Table 1.

Kitsai - Pawnee - Wichita Linguistic Separations*

| | |
|------------------|---------------------|
| Kitsai - Wichita | 1,200 - 1,500 years |
| Kitsai - Pawnee | 1,000 - 1,200 years |
| Pawnee - Wichita | 1,200 - 1,500 years |

*(See Parks, 1979, Table 1, et. al., for a concise but comprehensive overview. For additional discussion of Comparative Caddoan and diachronic topics generally, see Lesser and Weltfish (1932); Taylor (1963a) and (1963b); Chafe (1976) and (1979); and Parks and Rood (1975)).

The Kitsai (or Kichai) are believed to have lived during pre-historic times in what is now Oklahoma. However, when first encountered by Europeans (i.e., the French) in 1701, the Kitsai were living between the upper Trinity and Red Rivers in present-day northeast Texas. Their population, estimated at 500 persons in 1690, was steadily reduced by the introduction of the new white man's diseases and by Anglo-European

struggles for control. In 1855, the United States Government assigned the Kitsai to a small reservation on the Brazos River, where they remained until they were dispersed by the Texans. Fearing extermination, the Kitsai fled north to Oklahoma in 1858, and joined the related Wichita, whose culture was similar, and with whom the Kitsai remained. By 1889, their numbers had been reduced to 63. Although the U.S. Census of 1910 reports the total Kitsai population as numbering ten persons, the Wichita apparently regarded the Kitsai as members of their own tribe. All of the last speakers of Kitsai were also Wichita-speakers, including Kai Kai, the last fluent speaker of Kitsai, who died ca. 1940 (Fletcher (1907); Powell (1891); Swanton (1952); Chafe (1976)).

Although spoken by a handful of individuals earlier in this century, Kitsai is at present an extinct language, known only from a small number of documentary sources. The first of these is the vocabulary list of several dozen words collected by Lt. Amiel Weeks Whipple, and published in Whipple, et. al., Report Upon the Indian Tribes ... (1855). The second and, according to Chafe (1976) "...the only important source..." of documentary material on Kitsai, is the extensive corpus (ca. 780 foolscap pages) of texts recorded by ethnologist Alexander Lesser, a student of Franz Boas, during the course of fieldwork near Anadarko, Oklahoma, in the summers of 1929 and 1930. Lesser elicited his material from Kai Kai, a woman then in her eighties who was bilingual in Kitsai and Wichita, but who spoke no English. Lesser's preliminary investigations disclosed that Kai Kai was the last fluent native speaker of Kitsai. Kai Kai is believed to have lived until the late 1930's or early 1940's. She was the primary informant for Lesser's

fieldwork on the language, and it is her idiolect which Lesser's texts record. As no speakers of Kitsai are known to be alive at present, the Lesser texts constitute both the only significant documentation of the Kitsai language and the record of the speech of the last native speaker.

Lesser's corpus, totaling 25 texts of various lengths and consisting mainly of traditional narratives, was elicited from Kai Kai with the help of Tom Haddon, a Wichita-speaker who also knew English. Kai Kai dictated the narratives in Kitsai, and then translated them word-for-word into Wichita. The interpreter next translated her Wichita translation into English. Lesser reported that, as he learned some elementary Kitsai, the use of the interpreter diminished, although Haddon helped Lesser rework some of the glosses, (Bucca and Lesser 1969:7); Parks (1977):iii-iv,44; and Alexander Lesser, (personal communication, 1977). Lesser transcribed the texts phonetically using the orthographic recommendations of the American Anthropological Association's "Phonetic Transcription of Indian Languages" (A.A.A., 1916) and provided an interlinear translation in English.

Typescript copies of four of the longer texts were made available to us by Dr. Douglas R. Parks, who is currently editing the Lesser materials. These texts, subsequently published in Parks (1977), constitute the primary source of data for this study. References below to "the texts" denote these published texts. It is hoped that the present study will be expanded and refined at such time as additional textual materials are edited and made available.

As there are now no living speakers of Kitsai, and as our knowledge of the language consequently must be derived from the extant texts,

the method of analysis must necessarily be philological. By philology we mean

"...that part of the discipline of linguistics that is concerned with getting from texts and other recorded attestations of languages systematic information that is not directly conveyed by such records as they stand (Goddard 1976:73)."

Philology is, therefore, pre-eminently the linguistic analysis of texts, i.e., of samples of a particular language preserved in documents. A philological analysis of a text has as its goal the description of the linguistic system represented by the language of the text. The philologist's description of that linguistic system should be in as complete a form as the text will allow. Ideally, such an analysis would describe: (1) the semantic content of the text at the level of morphemes, words, phrases and sentences; (2) the syntactic system of the text; (3) the morphological structure of the text, i.e., inflection, derivation and composition; and (4) the phonology of the text. As the goal of this study is limited to a partial delineation of the phonological structure of the texts, the concern is primarily with phonology and with morphology only insofar as morphological structure illuminates phonological structure. No attempt has been made to present a morphological description, as such.

As an aspect of linguistic analysis, philological analysis seeks to describe patterns or regularities (here phonological regularities) of the language attested in the texts. This requires that the textual material be organized in such a way as to facilitate systematic analysis. The method employed in the analysis of the texts may be described as follows.

As the first step, each Kitsai form in the texts, together with each phonetic variant of each form, was entered on a separate slip with its gloss in English, together with the text number and line number of its occurrence. Thus, a full, typed lexicon to the texts was prepared with a complete set of carbon copies. The typed set of originals was filed alphabetically by the Kitsai forms to constitute an alphabetical lexicon or concordance to the texts. The set of carbon copies was then filed according to various criteria derived from semantic features shared by the glosses - in the case of verbs, usually those associated with the stems. Independent nouns and modifiers were then filed separately as sub-files of the semantic/gloss file.

The next step was to work systematically through the organized lexical slip files in an attempt to regularize the phonetic transcriptions which exhibited various inconsistencies. At this preliminary stage, some recourse was had to traditional techniques of phonemicization in order to distinguish, for example, probably allophonic variation from suspected instances of mis-hearing on the part of the transcriber. Some minimal pairs were encountered and noted for what assistance these might offer later in connection with establishing the shape of underlying phonological segments. In general, however, techniques of phonemicization were used only as a means of regularizing observed variants in the phonetic orthography. It should be noted that the only previous treatment of Kitsai phonology, i.e., that of Bucca and Lesser (1969), which was undertaken within a taxonomic phonemic framework, considers the evidence of contrasting minimal pairs only

partially supportive of the phonemic analysis (Bucca and Lesser 1969:13). In any case, our attempt to regularize the phonetic transcriptional variations of phonological segments continued throughout the course of the linguistic analysis. Many of these were gradually eliminated as work progressed.

Having been slipped and filed, the entire corpus of Kitsai forms was next subjected to as systematic and thorough morphological analysis as could be undertaken within the limitations of the texts. Utilizing the method of recurring partials, numerous prefixes, suffixes and stems were isolated, their allomorphs noted and their underlying phonological shapes posited, however tentatively. These isolated formatives were in turn slipped and placed in a separate file of grammatical elements. This grammatical file provided the morphophonemic evidence used to motivate the phonological rules. It should be noted that, consistent with the generativist's rejection of a phonemic level between the surface phonetic representation and the underlying phonological representation, the morphological analysis proceeded immediately upon slipping and filing the Kitsai forms in the texts. No attempt was made to undertake a complete phonemic analysis as a pre-requisite to the morphological analysis.

It should also be stated that the morphological analysis is scarcely exhaustive for all attested forms. There are several reasons for the incompleteness of such an analysis. First, the narrative style in which the texts are cast has resulted in the occurrence of classes of lexical items, especially verb constructions, which are closely related semantically and, to some extent, morphologically as well.

However, these classes of forms are of infrequent occurrence in relation to the combined representation of the members within each class. Moreover, these forms often exhibit either insufficient, or too complex, morphological variation to allow the investigator more than partial morphological control over the semantic variables operative within the forms. The problems arising from these factors are in turn made more intricate by the frequent attestation of hapax legomena, which often turn out to be complex verb forms crucial to the analysis of some paradigm or string of affixes. The fact that

...it has been widely observed...that of all the members of an open class (such as nouns and verbs) occurring in a body of text, slightly less than 50 percent of them will be hapax legomena (elements occurring just once)...(Samarin 1967:66).

is rather cold comfort, in view of the additional stumbling-block to morphological analysis. All of this is to be expected to some extent, of course, given the characteristics of a narrative corpus. Finally, an additional factor which contributes to the overall complexity of the morphological analysis is found in the structural characteristics of the language itself.

The following brief sketch of the most salient characteristics of the Caddoan languages will provide some background to the phonological analysis presented below. The traits described apply more or less equally to the member languages of the family.

Three word classes are defined on the basis of morphological structure: nouns; verbs; and adverbial modifiers. (There is some evidence, although limited, that clitics form a fourth grammatical class.) All three word classes utilize derivation in word-formation, but only nouns

and verbs are inflected. Inflection in nouns is limited to absolutivization, diminutivization, and pluralization. Inflection in verbs, on the other hand, is extensive, and contributes very heavily to the characteristic morphological complexity of these languages.

The languages of the Caddoan family are considered by specialists to be "...extreme examples of the language type known as polysynthetic" (Parks and Rood 1975:1), with 31 position classes described for Pawnee and 34 for Wichita; these classes are, in all cases, classes of bound morphemes. The various position classes for verbs can be divided into three "super-classes", consisting of (1): suffixes, mainly inflectional, which mark aspectual and dependence relationships; (2): prefixes, designating instrumental, locative and transitivity relationships, i.e., "semi-derivational prefixes"; and (3): traditional inflectional prefixes (Parks and Rood 1975:1). Weltfish, writing about her work on Caddoan over thirty years ago, stated that the

"...most fundamental structural aspect of the language is the verb complex...a thoroughly integrated unit comprising not only pronominal and active verb principles, but a wide variety of modal concepts, temporal elements, incorporated noun stems, locative, and adjectival stems, so fused and compounded that they form a single well-organized structure... [thus] a verb complex can occur in which the active verb stem is apparently lacking...due to the fact that the essentially verbal character of the complex is probably contributed by the modal" (Weltfish 1936:48).

In order to be syntactically complete, a verb form must be marked, either covertly or overtly, for at least these five categories: mode; person; number; aspect; and subordination. The form may, in addition, be optionally inflected for categories denoting possession, benefaction, tense, evidentiality, negation, interrogation, demonstration, exhortation, and also a number of different adverbial concepts. Finally, both

subject and object nouns are incorporated into the verb. Both the nominal object of a transitive verb and the nominal subject of an intransitive verb are frequently incorporated, while pronouns are always incorporated into the verb. In addition, the verb form is characterized by: a marked development of number, modal and aspectual distinctions; included possessive and dative elements; the virtual non-existence of tense distinctions; the marked development of evidential distinctions; and also numerous qualifying and local modifications of various types. In these and other respects, the languages of the Caddoan family represent North American Indian languages of a classic incorporating type (Parks and Rood 1975; Parks 1976). Our analysis of Kitsai strongly indicates that the language shares these family characteristics.

The form presented here will illustrate the preceding remarks concerning the morphological structure of the Kitsai verb, and will also give a flavor of the language:

KW-+ an- + a- + ya?okU + nahyonai + Wi + a #
 1 2 3 4 5 6 7

Evid. Pref. + Loc. + Dur./Indef. + Noun: 'child' + 'along with them(?)'
 1 2 3 4 5

+ Verb: 'dwell/sit' + Evid. Suff.
 6 7

'(3 sg) dwells there along with children'

The result, however, is that the investigator encounters difficult problems in the attempt to isolate morphemes and identify formative boundaries. The resulting morphological indeterminacy is an inconvenience in itself. Unfortunately, it also constitutes a major obstacle to establishing with reliable consistency the underlying phonological representations, and, therefore, to determining the canonical shapes of

formatives. And, of course, when working with an extinct language, the extensive paradigmatic gaps cannot be filled in through fieldwork. The fact that only a partial morphological analysis has been possible for many Kitsai forms is reflected in sequences glossed '(?)'. Also, material glossed as "Stem" may, and often does, contain strings of morphemes, the structure of which is not yet understood.

Finally, it has been confirmed by an experienced Caddoan specialist that the cognate languages, such as Pawnee and Wichita, are sufficiently remote from Kitsai in time depth that an attempted reconstruction of the Kitsai formatives from comparative data would not be feasible within the scope of a thesis such as this (Douglas R. Parks, personal communication, 1978).

The description of Kitsai phonology presented here takes for its theoretical basis the phonological theory developed by Noam Chomsky and Morris Halle in The Sound Pattern of English (1968). That work (hereafter SPE) in turn constitutes part of the linguistic metatheory elaborated by Chomsky in Aspects of the Theory of Syntax (1965) and termed transformational-generative grammar.

As noted above, previous linguistic work on Kitsai is represented exclusively by Bucca and Lesser (1969), hereafter cited as Bucca (1969) in view of Bucca's responsibility for the analysis presented therein. That article consists primarily of descriptive statements of phoneme distributions cast within a taxonomic phonemic framework. To this is appended a number of morphophonemic rules in which the "...basic alternant...is an actually occurrent allomorph (p. 17)." These morphophonemic rules (which are based on a very restricted number of

analyzed forms) constitute a series of largely disparate statements which, on examination, are found to refer to individual segments, rather than to natural classes of segments. The result is a substantial loss of generality in description. In fact, as will be shown, the disparate nature of the descriptive statements miss several linguistically significant generalizations which can be made with respect to the phonological structure of Kitsai. In all fairness, however, it should be stated that the analysis by Bucca represents a preliminary description, dealing as it does with phonological conditioning only, and points to a forthcoming grammar and lexicon (1969:17). In any case, Bucca's article does not constitute a comprehensive description of Kitsai phonology. We shall have occasion to refer to his analysis from time to time. Also, it is evident from a number of Kitsai forms cited by Bucca that his analysis was based on a different, and apparently larger, selection of the Lesser texts than the analysis presented here, the data for which is restricted to the texts published in Parks (1977). Occasionally, however, we have made use of Kitsai forms cited by Bucca from the other, unpublished Lesser texts. Where these cited Kitsai forms have been analyzed, I have noted the analysis as Bucca's. Unanalyzed Kitsai forms merely cited by Bucca are understood, as are Kitsai forms cited by me, to be Lesser's material in any case.

Several minor orthographic differences exist between Kitsai forms cited here, and those of the published Lesser texts (Parks 1977):

(1) textual ts here (as justified in Chapter 3) appears as c; (2) the textual distinction of h and x (the latter preconsonantly) reflects transcriptional convention rather than a phonetic difference (Douglas R. Parks, personal communication, 1978); consequently both h and x

appear here as h, as they do also in forms from Bucca (1969); (3) Bucca (1969) regularizes the textual distinction of u and o, and we have retained his orthography when citing forms from that source; (4) the textual transcription of "lax" or "marked-short" vowels with lower-case greek letters has been regularized here to lower-case Roman equivalents, throughout; (5) textual transcriptions of palatalization (t^y) and aspiration (K^h, n^h, w^h) are reproduced here only when specifically discussed in Chapter 7; (6) stress is marked very inconsistently in the texts, and has not been indicated here. In all other respects, the orthography of the texts has been carefully preserved.

As the title implies, this study is only a partial description and does not attempt to set forth a comprehensive overview, much less an exhaustive treatment, of Kitsai phonological structure. As indicated above, the focus here is on synchronic description, in view of the small amount of work done on the language to date.

Although the theoretical basis for this study is that of generative phonology, and we shall adhere closely to the model presented in SPE (1968), the emphasis is emphatically descriptive, and theoretical issues will not be discussed except where these are specifically raised by a problem of descriptive analysis. Also, this essay is not to be understood primarily as either a generative restatement, or a generative critique, of Bucca's taxonomic phonemic sketch (Bucca 1969) discussed above. This is, rather, an attempt to provide an essentially independent analysis of certain selected topics in Kitsai phonology, based primarily on philological analysis of the published Lesser texts, and relying occasionally on forms cited by Bucca (1969) from the other, as yet unpublished, texts in the Lesser corpus. Where the analysis here differs

from that of Bucca (1969), this fact has been pointed out. On the other hand, Bucca's solutions have been accepted in the absence of a preferred solution, or where counter-evidence is lacking. Throughout, the intent has been to provide descriptive analyses of Kitsai forms which capture evident phonological generalizations of the language. Specifically, attention has been concentrated primarily on phonological processes involving consonants, and vowel-related phenomena have been treated only in order to clarify consonantal phonology. Various phonological rules are motivated, and most of these pertain to the abstract underlying shape of surface consonant-clusters. It must be admitted that the phonological rules posited here have been motivated on the basis of rather sparse evidence (although the best available), and that the choices of underlying forms are, for the most part, not principled. A surface structure sequential constraint is motivated and some neutralizations are discussed. The topics covered reflect my own ongoing investigation of the language. Consequently, discussions of redundancy rules, readjustment rules, segmental and sequential constraints, morpheme structure conditions, and various other subjects traditionally covered in an "orthodox" generative phonological description do not appear here. This is essentially a progress report of the current investigation of the language, the aim of which is to provide a synchronic treatment of selected aspects of Kitsai phonological structure based on philological analysis of the published texts of Alexander Lesser and undertaken within the general framework of The Sound Pattern of English (1968).

Orthographic Conventions

The various orthographic conventions which have been adopted in this paper are as follows:

1. Single phonetic segments and clusters of phonetic segments, when referred to in prose, are italicized: *a*, *ab*, *abc*, etc.
2. Single phonetic segments and clusters of phonetic segments, when cited in an analysis, derivation, or rule, etc., are underscored (if at all) only as an aid to following the discussion: ab_hcde, e.g., when referring to an aspirated stop.
3. Prefixed elements are indicated by a following hyphen: a-, ab-, abc-, etc.
4. Suffixed elements are indicated by a preceding hyphen: -a, -ab, -abc, etc.
5. Underlying representations of words are bracketed by the word boundary: #.
6. Underlying representations of individual formatives/morphemes are bracketed by the formative/morpheme boundary: + .
7. Forms which are enclosed in slant brackets (/.../) indicate levels of representation relatively deeper than the surface phonetic, and possibly (but not necessarily) the deepest level of underlying representation; that is, forms so enclosed are to be understood as forms to which further rules may apply.
8. Forms which are not enclosed in the slant brackets (/.../) are assumed to be fully surface forms to which no further rules apply.

9. The deepest level of representation, i.e., the input to a derivation, is marked as the "Underlying Phonological Representation" by the letters "UR" adjacent to that line of the derivation. Similarly, the output of a derivation is marked as the "Surface Phonetic Representation" by "SR" adjacent to that line.
10. Derivations are presented with the hypothesized Underlying Representation as the top line of the column, and the derived Surface Representation as the bottom line.
11. Phonological rules, constraints, and other processes, etc., are numbered consecutively; e.g., (PR-n) and are provided with descriptive labels which are capitalized: REDUPLICATION.
12. The lower-case Roman letters in parentheses: (a), etc., are used to set off sets of example forms.
13. A single slash (/) separating forms or glosses, e.g., ab/ba; 'perhaps/maybe', may either indicate an alternation or simply mean "...or...".
14. Voiceless sonorants and vowels are indicated by capital letters: e.g., E denotes "voiceless e", etc.
15. Aspiration and Palatalization are indicated by raised letters, as: b^h, d^y, respectively.
16. In other respects, the notational conventions of generative phonology used throughout this paper are, unless otherwise noted, those of The Sound Pattern of English (Chomsky and Halle, 1968).

Morphological Abbreviations

| | |
|---------|----------------|
| Abs. | Absolutive |
| Accomp. | Accompaniment |
| Concl. | Conditional |
| Dist. | Distributive |
| Du Ex | Dual Exclusive |
| Du In | Dual Inclusive |
| Dur. | Durative |
| Evid. | Evidential |
| Fut. | Future |
| Ger. | Gerundial |
| Hort. | Hortative |
| Imp. | Imperative |
| Incho. | Inchoative |
| Ind. | Indicative |
| Inf. | Infinitive |
| Instr. | Instrumental |
| Intent. | Intentive |
| Inter. | Interrogative |
| Iter. | Iterative |
| Loc. | Locative |
| Mod. | Modifier |
| N | Noun |
| Neg. | Negative |
| Obj. | Object |
| Pass. | Passive |

Morphological Abbreviations

| | |
|----------|------------------------|
| 1/2/3 p. | 1st, 2nd or 3rd person |
| Pl. | Plural |
| Pl Ex | Plural Exclusive |
| Pl In | Plural Inclusive |
| Pot. | Potential |
| Pref. | Prefix |
| Pro. | Pronoun |
| Recip. | Reciprocal |
| Reflex. | Reflexive |
| Sg | Singular |
| Subj. | Subject |
| Suff. | Suffix |
| V | Verb |

¹Some additional earlier descriptions of Caddoan languages are included in the bibliography.

2. PHONOLOGICAL REPRESENTATIONS

The Kitsai language utilizes fourteen distinctive segments at the abstract phonological level of representation. These include six obstruents, four sonorants, and four vowels. Although the language is known to have at least primary stress, and also vowel length, the status of these features is at present indeterminate with respect to distinctiveness (Bucca 1969:12-13); the same holds true for the other suprasegmental features.

One of the most striking features of the Kitsai phonological system is the low number of segments in its phonetic inventory. This sparseness of phonetic elements is a characteristic shared by the cognate languages as well. Parks notes, with reference to Pawnee, that its total inventory of ten segments - two less than Kitsai - is one of the smallest inventories encountered among the world's languages (Parks 1976:12). Rood, in commenting on Wichita, could also be describing Kitsai when he points to the lack of almost universal sound categories (such as labial stops) and the absence of symmetry between the stop and the spirant series, concluding that the "...configuration, as well as the system, is unusual" (Rood 1975:316, 317). Much the same situation is reported for Caddo (Chafe 1976) and Arikara (Merlan 1975).

These phonetic segments, along with their alphabetic abbreviations, are set forth in Table 2. The form of presentation there adopted is that of a fully specified classificatory distinctive feature matrix, as formulated in The Sound Pattern of English by N. Chomsky and M. Halle (1968).

Table 2.

Kitsai Systematic Phonemic

Classificatory Distinctive Feature Matrix for Kitsai Systematic
Phonemic Segments.

| | t | k | ʔ | c | s | h | n | r | w | y | i | u | e | a |
|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| syll | - | - | - | - | - | - | - | - | - | - | + | + | + | + |
| son | - | - | - | - | - | - | + | + | + | + | + | + | + | + |
| cons | + | + | - | + | + | - | + | + | - | - | - | - | - | - |
| cont | - | - | - | - | + | + | - | + | + | + | + | + | + | + |
| ant | + | - | - | + | + | - | + | + | - | - | - | - | - | - |
| cor | + | - | - | + | + | - | + | + | - | - | - | - | - | - |
| high | - | + | - | - | - | - | - | - | + | + | + | + | - | - |
| back | - | + | - | - | - | - | - | - | + | - | - | + | - | + |
| vce | - | - | - | - | - | - | + | + | + | + | + | + | + | + |
| nas | - | - | - | - | - | - | + | - | - | - | - | - | - | - |
| del. rel. | - | - | - | + | - | - | - | - | - | - | - | - | - | - |

The system of Chomsky and Halle (1968), which is the phonological theory essentially adopted in this study, defines three major class features: + consonantal, + sonorant, and + syllabic. These primary class features in turn differentiate the five major classes of phonetic segments set forth here:

| | |
|------------------|---|
| Obstruents | (- sonorant, - syllabic, + consonantal) |
| Resonants | (+ sonorant, - syllabic, + consonantal) |
| Voiceless Glides | (- sonorant, - syllabic, - consonantal) |
| Semi-vowels | (+ sonorant, - syllabic, - consonantal) |
| Vowels | (+ sonorant, + syllabic, - consonantal) |

The segmental and suprasegmental phonemes of Kitsai, set forth in a conventional inventory presentation, are as follows:

Table 3.

Kitsai Phonemic Inventory

| | <u>Labial</u> | <u>Alveolar</u> | <u>Palatal</u> | <u>Velar</u> | <u>Glottal</u> |
|--|---------------|-----------------|----------------|--------------|----------------|
|--|---------------|-----------------|----------------|--------------|----------------|

Obstruents

| | | | | | |
|------------|--|---|--|---|---|
| Stops | | t | | k | ʔ |
| Affricates | | c | | | |
| Spirants | | s | | | h |

Sonorants

| | | | | | |
|--------|---|---|---|--|--|
| Nasal | | n | | | |
| Median | w | r | y | | |

Vowels

| | Front | Back |
|---------|-------|------|
| High | i | u |
| Mid-Low | e | a |

Suprasegmentals

- √ Primary Stress
- V: Vowel Length
- # Word Boundary
- + Morpheme/Formative Boundary

3. THE AFFRICATE

In Salvador Bucca's taxonomic phonemic description of Kitsai phonology (Bucca 1969), two consonant clusters are listed among the other bisegmental clusters, which consist of the sequence stop + dental spirant. These two clusters, ks and ts, are the only two such clusters in the language. Bucca's stated reason for a bisegmental analysis of these segments is that "It appeared more convenient to consider ts as a two consonant cluster because of system and distributional parallelism..." (1969:9); presumably 'parallelism' here refers to ts in relation to ks.

We believe that an analysis which regards ts as monosegmental can be motivated more strongly than one which treats ts as bisegmental. In addition, such an analysis substantially reduces the complexity of various other consonant clusters. Specifically, we maintain that Bucca's ts cluster is best represented not as a cluster at all, but as the unitary affricate segment c, while ks can be shown to be a genuine cluster consisting of the sequence k + s.

First, it will be observed that ts occurs in surface representation word initially:

| | |
|-------------|---------------------|
| tsahka | 'again' |
| tsakitski | 'girl' |
| tsowakarayu | 'gourd-rattle' |
| tsiwanyu | 'let us (du in) go' |

word finally:

| | |
|---------------|-----------------|
| akwats | 'all' |
| itke:kitskits | 'early morning' |

and in the prefix kats- 'long'

intervocalically:

tatsanu 'bedstead'

nawi:tsa '(3 sg) arrive-comes'

adjacent to other consonant segments:

taytsatu 'knife'

awitsko '(3 sg) thinks'

sohtskwitsko 'if you think'

The cluster ks appears to parallel ts in its distribution, also occurring word initially, although in an isolated form:

ksokawitareakwi 'ring'

intervocalically:

ahoksata '(3 sg) goes down into water'

akakso:hu 'shouting repeatedly'

aratsawaksiki 'torn into shreds'

word finally:

nyuks 'deer doctors/deer dance'

askwaks 'raven'

before a consonant, following a vowel:

nikskate:tu 'arrow-powerful (= 'bullet')'

siniotsikstawati 'is unhanded by'

following a vowel and before a semi-vowel:

aksya 'by now'

askwaks 'raven'

However, the putative distributional parallelism of ts : ks is by itself insufficient to motivate the choice of a monosegmental or bisegmental analysis. All that has been shown so far is that both ts and ks behave like other consonants and can form constituents of other, more complex consonant clusters. As it stands, both ts and ks could be unitary segments.

The crucial evidence, however, is to be found in several forms in which k is apparently aspirated when followed by s. Consider the following forms, in which the Intensive Suffix -sikyayu 'is/are going to' is affixed to a form in final k:

nihyahkarokh + sikyayu 'they (pl) are going to plant them'

natarakiriwatak h + sikyayu 'we (in pl) are going to run'

as opposed to forms in which the Intensive Suffix is affixed to vowel-final forms, as follows:

nanawi:tsya + sikyayu 'maybe is going to come'

niyani + sikyayu 'they (pl) are going to eat'

It is clear that, in these forms above, the suffixed -sikyayu contributes the segment s to the ks clusters. These instances of ks must be therefore regarded as containing the internal formative boundary, i.e., k + s.

The nature of aspiration in Kitsai has been discussed in Chapter 7, where aspiration phenomena are considered surface phonetic manifestations of a vowel devoicing rule. In this case, the sequence ...k^h + sikyayu could be regarded as the surface representation of underlying /...ku + sikiiau #/ before VOWEL DEVOICING and GLIDE FORMATION have applied and produced ...k^h(+) -sikyayu #.

In any case, the presence of a formative boundary between k and s in these forms, apart from the matter of intervening devoiced vowels, provides a strong argument in favor of regarding ks -- or at least certain occurrences of ks -- as arising from affixation. Many other forms exhibiting the ks cluster also show the tell-tale "aspiration", for example:

sitsihoyakh + sahtsko 'let us (du in) go seek him'

In the case of ts, however, the test of "aspiration" on the segment t cannot apply, as ts never occurs on the surface as t^hs. Also, no occurrence of ts has yet been found to be analysable as t + s, such that the formative boundary is clearly present.

The effects of regarding surface phonetic ts as the monosegmental affricate c are twofold: (1) the Kitsai segmental inventory is provided with a true affricate, which it otherwise lacks; (2) the structure of a number of consonant clusters (Bucca 1969:14) in the language is simplified, as follows:

Table 4.
Reanalysis of Affricate Clusters

| | | | | | |
|------------|---------|----|--------------|---------|------|
| <u>ts</u> | becomes | c | <u>yts</u> | becomes | yc |
| <u>tst</u> | becomes | ct | <u>tsky</u> | becomes | cky |
| <u>tsk</u> | becomes | ck | <u>tskw</u> | becomes | ckw |
| <u>tsn</u> | becomes | cn | <u>ktsk</u> | becomes | kck |
| <u>tsy</u> | becomes | cy | <u>htst</u> | becomes | hct |
| <u>ts?</u> | becomes | c? | <u>htsk</u> | becomes | hck |
| <u>?ts</u> | becomes | ?c | <u>htsn</u> | becomes | hcn |
| <u>sts</u> | becomes | sc | <u>htsy</u> | becomes | hyc |
| <u>hts</u> | becomes | hc | <u>htskw</u> | becomes | hckw |
| <u>kts</u> | becomes | kc | | | |

4. THE VOWELS

An adequate analysis of the Kitsai vowel system would properly include, in addition to treatment of vowel-deletion and vowel-coalescence phenomena, description of an apparent three-way surface phonetic length distinction between "marked-long", "marked-short/lax", and "unmarked" consideration of voicing and devoicing processes, description of primary and secondary stress, and also pitch or tone.

Because of various indeterminacies obtaining across several variables in the vowel-features attested in the available texts, we have chosen to omit a detailed analysis of the vowel system in favor of a brief sketch of certain select vowel-related phenomena which directly pertain to this essay's primary concern with consonantal phonology. Specifically, we shall attempt to do two things in this section: (1) indicate the evidence in favor of positing a four-vowel system for Kitsai; and (2) motivate a rule of vowel-lowering which converts underlying u to surface o in several predictable environments.

The texts distinguish three qualities, or grades, of vowels on the surface phonetic level of representation: those which are marked as "long", those marked as "short" or "lax", and those which are unmarked. Any of these may, in turn, be additionally marked for primary stress.¹ The surface phonetic vowels, then, are shown in the following:

Table 5.

Kitsai Vowels: Surface Phonetic Representations

| | Front Unrounded | Central Unrounded | Back Unrounded | Back Rounded |
|----------|--------------------|----------------------|-------------------|-----------------|
| High | i | | | u |
| Mid-High | e | | | o |
| Mid-Low | | | | |
| Low | | | a | |

Of these, any may appear (a) interconsonantly, or (b) word finally, as in the following forms:

(a)

| | |
|------------------|-------------------------|
| kakonikariki | 'none stands inside' |
| kinuhteakwe:nata | 'certain morning comes' |
| nenire?ana | 'they (pl) stop' |
| natkahtaktes | 'middle-darkness' |

(b)

| | |
|------------------|---------------------------|
| akoyaksa | '(3 sg) seeks' |
| arahkosnu | '(3 sg) makes provisions' |
| ara?orariki | 'is in hand foremost' |
| ari:ko | 'horn' |
| koyakorikatehowe | '(3 sg) took in arms' |
| kukuhikste | '(3 sg) died' |

But only a, i, and o appear word initially; u and e never do.

(c)

| | |
|---------|----------------------------|
| akahca | 'town is' |
| isiyu | 'come!' (sg) |
| okitawi | '(3 sg) sits up thereupon' |

The preceding may be summarized as follows:

Table 6.

Kitsai Vowel Distributions

| | # | C | C | # |
|----------|---|---|---|---|
| <u>a</u> | + | + | | + |
| <u>i</u> | + | + | | + |
| <u>e</u> | - | + | | + |
| <u>u</u> | - | + | | + |
| <u>o</u> | + | + | | + |

It is clear from the evidence of minimal pairs that a relationship of mutual distinctiveness holds between four of the five vowels, i.e., a, i, u, e, as follows:

(d)

| | | |
|---------|-------------------------|----------------------|
| tinini | 'at this place' | <u>i</u> :: <u>a</u> |
| tinana | 'at this time' | |
| taki | 'some' | <u>u</u> :: <u>i</u> |
| tahku' | 'coyote' | |
| asiwinu | '(3 sg) will be hungry' | <u>i</u> :: <u>e</u> |
| asewinu | 'you will be hungry' | |
| akaruk | '(3 sg) gathers' | <u>u</u> :: <u>a</u> |
| akarak | '(3 sg) kills them' | |
| kokowe | '(3 sg) dwelt' | <u>e</u> :: <u>a</u> |
| kokowa | '(3 sg) went' | |

| | | |
|----------|-----------------|----------------------|
| awicku | '(3 sg) thinks' | <u>e</u> :: <u>u</u> |
| awicke?u | '(3 pl) think' | |

The distinctiveness of a, u, e, and i can also be shown from morphological evidence. Consider these monosegmental word-initial morphemes:

(e)

| | |
|-------|-----------------------|
| a- | 'Indefinite/Durative' |
| i- | 'Imperative' |
| o-(u) | 'there' ('Locative') |

The segment e does not occur word initially; the same holds for u. However, it will be shown that o is best regarded as an alternant of u, wherever it occurs. The phone e, on the other hand, lacks a word initial alternant altogether.

Additional morphological evidence for the distinctiveness of a, e, i, and u is also provided by pluri-segmental morphemes such as these:

(f)

| | |
|------|----------------|
| ni- | '3 pl' |
| ne- | '3 poss.' |
| nu- | '3 obj.' |
| na?a | '(3 sg) comes' |

We conclude on the basis of evidence such as that presented above, that Kitsai possesses the four vowels a, e, u, and i in the underlying phonological representation, and therefore posit these underlying segments.

The choice of u over o here (and elsewhere below) is not, strictly speaking, a principled one. Several factors, however, have led us to posit u as the underlying segment both in the vowel system and in various formatives and rules: (1) both Parks (1976) and Rood (1976) posit u for the respective cognate languages Pawnee and Wichita; (2) Chafe (1976) likewise reconstructs u (and not o) for Proto-Caddoan; (3) one specialist has stated that positing underlying u simplifies the description of other phonological processes in Caddoan languages (Parks, personal communication, 1980); (4) we maintain that positing u in the underlying representations is additionally justified on the basis of symmetry.

It can also be shown, we believe, that whereas both u and o occur in surface structure, o represents an alternant of underlying u, and that this alternation is phonologically conditioned and therefore predictable.

Table 7.

Kitsai Vowels: Underlying Phonological Representations

| | Front | Back |
|------|-------|------|
| High | i | u |
| Low | e | a |

As noted above, only o occurs word initially, as shown by these forms below:

(g)

| | |
|-------------|-----------------|
| ok | 'be/is' |
| o:s | 'owl' |
| oyatanikonu | 'where town is' |

There is a strong tendency for o to appear interconsonantly,
as follows:

(h)

| | |
|------------------|---------------------------|
| oyatanikonu | 'where town is' |
| asakowinu | 'I shall be hungry' |
| kokohonitkwe | '(3 sg) settled to sleep' |
| ara?orariki | 'is in hand foremost' |
| kokokosikya | '(3 sg) took up' |
| kokotonoyaniskwa | 'afoot- starting- went' |

The examples cited immediately above illustrate the point; the list could be extended to include all consonantal environments.

It is evident that some free variation may be present, as shown, for example, by these forms below; the verb stem is uk 'be':

(i)

| | |
|-----------|--------------|
| kanyuk | 'is not' |
| kanyok | " |
| kanatyok | 'I am not' |
| kanatyuk | " |
| wanyuk | 'is like' |
| ickorok | 'good is' |
| ikoko | 'that is' |
| ka?anyoku | 'may not be' |

In general, however, the pattern of u converting to o interconsonantly holds true, both within individual forms, and from form to form.

| | | |
|------|-------------------|--|
| ?__# | awicke?u | 'they (pl) think' |
| c__# | necakicacu | 'watermelon' |
| | kwitacu | 'head' |
| h__# | akakso:hu | 'shouting repeatedly' |
| | nikayato:hu | '(3 sg) regularly finishes much' |
| s__# | akatake:su | 'naked' |
| | natkwiruwawani:su | 'is head (?) all-over scratched' |
| | niksu | 'arrow' |
| n__# | itkanu | 'powder' |
| | yatonu | 'chief' |
| | akaso:nu | 'where within lies' |
| r__# | nah?iru | 'youngest' |
| | a?iru | '(3 sg) parcels out' |
| y__# | ka:sanyu | '"go you (sg) about?"' |
| | a:kayu | 'spread out, moving about, scattered (pl)' |
| | natinohyahkarikyu | '"I've mine (pl) inside standing"' |

On the basis of evidence such as the preceding, we conclude that o represents an alternant of u. The choice of u as the underlying abstract representation is not, however, arbitrary. While variant forms as kanyuk / kanyok, 'is not', do not suggest one alternant over (or in this case "under") the other, those forms whose free variants comprise alternations of their final segments, such that VC# alternate with VCV#, as in these following forms:

(1)

| | |
|------------|----------|
| warasnyuk | 'bad is' |
| warasnyuku | 'bad is' |

ikwanasiku 'maybe thus you (2 sg) are'
 ikwasik 'thus you (2 sg) are'

in which -uk# alternates with -uku#, provide a strong basis for positing u as the underlying representation.

To capture the significant generalizations with respect to the alternation of u with o, we posit the following rule:

PR-1: VOWEL LOWERING

$$u \rightarrow o / \left\{ \begin{array}{l} \left[\begin{array}{c} C \\ \# \end{array} \right] _ C \\ \left(\left[_ \# \right] \right) \end{array} \right\}$$

It has been noted already that Kitsai possesses a three-way distinction of vowel length: short, long, and unmarked. It is apparent from a study of the texts that these distinctions of vowel length cross-cut a distinction between "open" and "close" (i.e., "tense" vs. "lax") vowel quality, (Table 5, above) and that both the distinction by length and the distinction of lax/tense is cross-cut by stress and also by pitch. While Bucca maintains that Kitsai is not known to be a tone language, he does note that both stress and pitch are "unstable" (Bucca 1969:12-13). Because of the complexity of textual evidence and the evident phonetic variables, I have omitted consideration of these vowel phenomena, but rather have attempted instead to provide substantial motivation for Vowel Lowering because it appeared to be the most consistently marked vowel feature and most clearly the result of predictable rule. Bucca (1969:12-13), in fact, maintains that certain of the vowel-related phenomena indicated above here are freely variable in any case.

The application of VOWEL LOWERING (PR-1) may be seen in the following derivations.

| | | |
|----|--------------------------------------|--|
| UR | / # ka + ku + ni + hunas + u:hu # /: | (Neg. + Obj. + Pot. + Stem + Iter.) |
| | / # ka + ko + ni + honas + o:hu # / | VOWEL LOWERING |
| SR | kakonihonaso:hu | '(3 sg) repeatedly none finds' |
| UR | / # uyatan + ik + unu # / | (Noun stem + (?) + Loc.) |
| | / # oyatan + ik + onu # / | VOWEL LOWERING |
| SR | oyatanikonu | 'where town is' |
| UR | / # ickur + ati + rikukun + u # / | (Mod. + 1p. Poss. + Stem + Abs.) |
| | / # ickor + ati + rikokon + u # / | VOWEL LOWERING |
| SR | ickoraticrikokonu | 'good my feeling is' |
| UR | / # s + uhc + kwick + u # / | (2p. + Preverb + Stem + Abs.) |
| | / # sohck + kwick + o # / | VOWEL LOWERING |
| SR | sohckwicko | 'if you think' |

NOTES TO CHAPTER 4

¹At least, it is assumed that it is primary stress which is being marked; Bucca considers stress, pitch and long vowel-length as "unstable" (1969:12-13).

²The forms taki 'some' and tahku 'coyote' constitute a quasi-minimal pair, rather than a true minimal pair.

5. RESONANT ALTERNATION (N-FORMATION)

The alternation of the resonant segments r and n is a phenomenon which affects many forms in the Kitsai language. This alternation, by which underlying r is converted to n, is predictable, but is formulation is somewhat complex.

First, note that n occurs on the surface both word initially, as in the following forms:

(a)

| | |
|--------------|---------------------------|
| nasonit | 'Caddo' |
| nacaksanu | 'that with which is shot' |
| nikwanitkanu | 'sickness among them' |

and word finally, as follows; these, however, are much less frequently encountered:

(b)

| | |
|--------------|------------------------------|
| notitohkwe:n | '(3 sg) puts on back of him' |
| akaron | '(3 sg) makes a fire' |
| sawa?an | '(du) eat' |

The segment r, on the other hand, never occurs either word-initially or word-finally. (The only possible exception to this is cirar 'water-bird', cited by Bucca (1969:11)). We regard this possibly onomatopoeic form a probable instance of r followed by a voiceless word-final vowel, as in nah?iru 'youngest', in which the onset of the voiceless segment might not be heard. Alternately, cirar may represent an instance of r followed by glottal stop as in katari:r?, 'squash', and tar?tar? 'buffalo voice', both of which forms are cited by Bucca (1969:16) as unique examples.

The fact that the forms katari:r? and tar?tar? are regarded by Bucca (1969) as hapax legomena is itself interesting, in that these two forms constitute the only counterexamples to the otherwise exceptionless rule that r appears in surface representation intervocalically only, or preceded by y and followed by a vowel, as in the following forms:

(c)

| | |
|------------------|---------------------------------------|
| nakiri:?a | '(3 sg) comes with (contained) water' |
| arahkwatiki | '(pl) are bloody' |
| kanyenirikoku | 'they (pl) await (him) not' |
| newirosnana | '(3 sg) rolls self over and over' |
| akeriwati | '(3 sg) saves' |
| koyakorikatehowe | '(3 sg) took in arms' |
| kokore:tirikya | '(3 sg) spitted them (impaled)' |
| nare:a | '(3 sg) comes with them (pl)' |

or in the following:

(d)

| | |
|-------------|-----------------------------|
| ikonyonayru | 'thus they (pl) intend' |
| ni:kayrat | 'they (pl) sate themselves' |

The segment n, however, in addition to its appearance in surface representation word initially and word finally, also appears on the surface pre-vocalically, following one of the obstruents: t, k, c, and s, and thereby creates the clusters: tn, kn, cn, and sn, as follows:

(e)

| | |
|-----------------|-----------------------------|
| acikwahtnu | 'prairie grass' |
| kwahtnu | 'red' |
| aknihko | '(3 sg) tells them (pl)' |
| nutaknu | '(3 sg) refers to it' |
| korawaknu | '(3 sg) sings' |
| kacnirawa:ki | 'long time extends' |
| kahcnu | 'white' |
| nutasnayanikok | '(3 sg) grasps him by feet' |
| warasnerikokonu | 'bad his feeling' |

In addition, n occurs on the surface post-vocalically or word-initially, and followed by the segment y, as in these following forms:

(f)

| | |
|-------------------|--|
| wanyuk | 'is like' |
| kokowanya | 'they went' |
| kyoksanasihenanya | 'how many colds may've become I know not how many' |
| kokokirikanya | '(3 sg) awakened' |
| nyotawa?a | 'they (pl) bathe' |

Finally, n, like r, appears in surface representation inter-vocalically:

(g)

| | |
|--------------|-------------------------------|
| ananatya | '(3 sg) may have been frozen' |
| awiknieawana | '(pl) are put in order' |
| yakohinosana | 'to be come sated' |
| nyunanayata | 'they (pl) footrace' |
| nuyahyakaunu | 'in its doorway' |



The intervocalic surface appearance of both n and r provides the basis for regarding each as a distinctive segment of Kitsai.

Consider the following sets of forms:

(h)

| | |
|---------|---------------------------|
| ara?ana | 'in hand goes about' |
| ana?ana | 'there (3 sg) goes about' |

(i)

| | |
|--------|-----------------------|
| arahwi | '(pl) sit/grow/dwell' |
| ana:wi | 'there (3 sg) dwells' |

(j)

| | |
|--------|---------------|
| inucia | 'that way is' |
| iruci | 'pup' |

It would therefore appear reasonable to establish both n and r as distinctive systematic phonemes of Kitsai.

At the same time, it is apparent that n and r alternate as allophones of one underlying segment. Consider the following forms:

(k)

| | |
|--------------|-----------------------|
| na?a | '(3 sg) comes' |
| kinara?a | 'certain time comes' |
| kina | (kina 'certain time'+ |
| + na?a | '(3 sg) comes') |
| natkat | 'at dark' |
| natkahtaktes | 'middle-darkness' |
| aratkyena | 'becomes dark' |
| niratkyena | 'dark becomes' |

| | |
|-----------------|--------------------------|
| kokoratyena | 'dark became' (Evid.) |
| naitkwio | 'the spitted (impaled)' |
| kokoraitkwiokya | 'unspitted them' (Evid.) |

On the basis of the preceding it is clear that while n contrasts with r intervocalically, word-initial n and intervocalic r alternate.

Although an alternative solution would be to posit a rule whereby underlying n becomes r following a vowel which is immediately followed by a formative boundary, i.e., when r follows V+___, the behavior of the Potential Prefix ni- in the forms below makes it clear that such a rule cannot be motivated.

(1)

| | |
|---|-------------------------------------|
| UR / # ka- + ku- + ni- + humas + u:hu # / | |
| | (Neg. + Obj. + Pot. + Stem + Iter.) |
| SR kakonihonas:hu | '(3 sg) repeatedly none finds' |

(m)

| | |
|---|-------------------------------------|
| UR / # tiku- + ni- + kirik + u: + -ki # / | |
| | ('thus' + Pot. + Stem + Abs. + Pl.) |
| SR tikonikiriko:ki | 'thus eyes are' |

(n)

| | |
|---------------------------|--------------------------|
| UR / # ka- + nehayaki # 1 | |
| | (Neg. + Stem) |
| SR kanehayaki | '(3 sg) understands not' |

The question then becomes one of determining the status of post-consonantal n. As noted above, n appears in surface representation preceded by the obstruents t, k, c, s.

Consider the following sets of forms:

(o)

| | |
|----------------------|------------------------------|
| araikiteari:tik | 'they (pl) get up upon them' |
| isnaknaikiteari:tiko | 'you (pl) get up upon them!' |

(p)

| | |
|----------------|-------------------|
| nawaknanana | '(3 sg) imitates' |
| kokowakaranana | '(3 sg) imitated' |

(q)

| | |
|----------------------|------------------------------|
| isnakwihu | 'you (pl) go after!' |
| isnaknaikiteari:tiko | 'you (pl) get up upon them!' |
| tesnakoyatanu | 'here you (pl) in town' |
| itarakyaskwanyu | 'let us (in pl) go hunting' |
| itarakori:skwanyu | 'let us (in pl) return-go' |

Alternations such as these above in, e.g., the plural-marker prefix rak- / nak-, suggest that n, when preceded by t, k, c, or s, is to be interpreted as an alternant of intervocalic r. Morphological evidence is thus far insufficient to establish that this is also true of word-final n, but it seems probable. Further, it appears that n may, like r, occur in surface phonetic representation following y and before a vowel:

(r)

| | |
|-----------------------|--------------------------|
| kusiakurayna?uhkataha | '(du) came upward-among' |
|-----------------------|--------------------------|

Although this form is a hapax legomenon, it appears to be a clear-cut instance of the sequence yn + V. It is also possible that the sequence e : n in these forms below represents surface phonetic V + yn # / V, but a case in which the vowel preceding yn is e rather than a:

(s)

| | |
|---------------------|------------------------------|
| akonaitohkwe:n | '(3 sg) loads them on me' |
| notitohkwe:n | '(3 sg) puts on back of him' |
| nakwi:ckokwe:nu | 'is become me sleepy' |
| kinuhteakwe:nata | 'certain morning comes' |
| hiniyohcteakwe:nata | 'when is next morning' |

The following pair of forms suggests that the posited equivalence of e: and ey may be correct:

(t)

| | |
|----------------|----------------------------------|
| ne:kihi:awa?a | '(3 sg) vomits himself of water' |
| neyakihi:awa?a | '(3 sg) himself disgorges water' |

Before attempting to formulate this situation in terms of phonological rules, let us examine the way in which Bucca (1969) handles these facts.

First, Bucca (1969) gives distributional information about n and r and then offers several disparate rules in which some instances of r become n. Bucca's rules and examples (1969:10, 11, 18) are as follows:

B-8:

$$\underline{t} + \underline{r} = \underline{\emptyset n}$$

| | |
|-----------------------------|-------------------------|
| at + rihku = anihku | 'I tell' |
| nut + rahikahu = nunahikahu | 'he is telling a story' |

B-9:

k + r = kn

atak + rihku = ataknihku 'I tell them (pl)'

atarak + rikuku = ataraknikuku 'we (in pl) are
sensible'

B-10:

s + r = sn

as + rikuku = asnikuku 'you are sensible'

as + rak + rihku = asnaknihku 'you (pl) tell him'

Bucca (1969) clearly regards the n in the output clusters of his rules above as deriving from an underlying r. However, in his rule B-8 above, the underlying cluster is regarded as being destroyed by deletion of the stop. Nowhere among Bucca's rules is to be found an output of a rule in which surface phonetic tn appears. And, in his tabulation of permitted bisegmental consonant clusters, the sequence tn is marked as non-occurring (1969:14-15). However, the cluster tn does in fact occur in surface representation in forms cited elsewhere in his description (1969:16, 17):

(u)

kwahtnu 'red'

acikwahtnu 'prairie grass'

(aci?u? 'grass'

+ kwahtnu 'red')

and in a form not cited by Bucca (1969) but attested in the texts:

(v)

nahkokwahtnakawe 'painted-red come toward them'

The clusters kn and sn, as noted above, are correctly regarded as deriving from underlying kr and sr, respectively.

However, a problem arises in connection with Bucca's treatment of the underlying source of the cluster cn, surface phonetic examples of which I have cited above in this section. Bucca nowhere provides a rule to account for surface appearances of cn, a cluster whose appearance we refer to above here. We believe that the reason he does not is related to his decision (1969:9) to regard t^s as bisegmental ts rather than as the single affricate segment t^s as we have done by rendering it as c. We have elsewhere here (Chapter 3) given our reasons for doing so. Presumably, Bucca would regard ts (read c) as an example of his rule B-10 above, i.e., (t)s + r = sn.

The pertinent distributional facts concerning n and r may be summarized here:

Table 8.

Resonant Alternations

| {n} | {r} |
|--|--------------------------------------|
| occurs in surface representation: | occurs in surface representation: |
| 1. # ___ V | |
| 2. V ___ # | |
| 3. V ___ V | V ___ V |
| 4. y ___ V | y ___ V |
| 5. $\left[\begin{array}{c} t \\ k \\ c \\ s \end{array} \right] \text{---} V$ | |
| 6. $\left[\begin{array}{c} V \\ \# \end{array} \right] \text{---} y$ | |
| 7. | V ___ ? (tentative) |

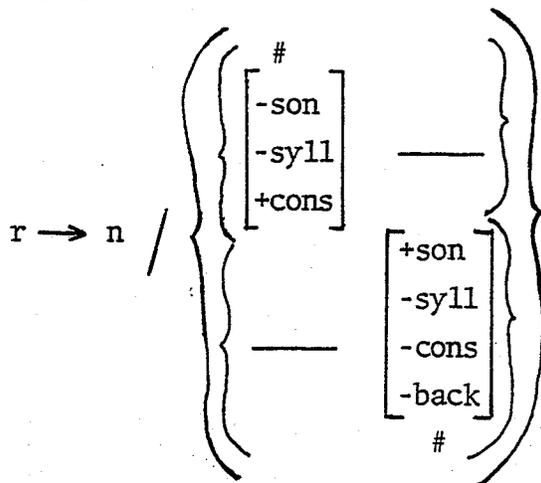
To conclude this section, it is clear that r and n should be maintained as distinctive segments in underlying phonological representation when in intervocalic position, and when preceded by y and followed by a vowel, as follows:

$$\begin{array}{l}
 / r / \quad : \quad \left[\begin{array}{c} V \\ y \end{array} \right] \text{---} V \\
 \\
 / n / \quad : \quad \left[\begin{array}{c} V \\ y \end{array} \right] \text{---} V
 \end{array}$$

It is also clear that r underlies the surface phonetic bisegmental clusters; tn, kn, cn, sn: r also underlies surface phonetic # n ..., and probably surface phonetic ... n # as well. Surface phonetic appearances of n preceding y, as in No. 6 of Table 8 (above), can be shown to result from the application of two rules, the first converting # ri ... to # ni ..., and the second converting the sequence # ni + V to # nyV; this has been discussed in another section here. The choice of r over n in PR-2 is at present not a principled one.

In light of the above considerations, it appears reasonable to describe the alternation of r with n as a neutralization in certain environments of the contrast maintained intervocalically, and to formulate it as follows:

PR-2: N-FORMATION



The application of N-FORMATION to underlying representations is shown by the following derivations:

(w)

UR / # ra- + wak + ra + nana # / (Ger. + Noun Stem: 'voice'
+ (?) + Verb Stem)

/ # na- + wak + na + nana # / N-FORMATION

SR nawaknanana '(3 sg) imitates'

(x)

UR / # i- + s- + rak- + rai- + (Imp. + 2p. + pl 3p. +
kiteari: + -tiku # / Stem + 'upon')

/ # i- + s- + nak- + nai- +
kiteari: + -tiku # / N-FORMATION

/ # i- + s- + nak- + nai- +
kiteari: + -tiko # / VOWEL LOWERING

SR isnaknaikiteari:tiko 'you (pl) get up upon them!'

6. H-FORMATION

Bucca (1969) posits three separate rules to account for an evident alternation of n with h in preconsonantal position (Bucca 1969:18). His rules are as follows:

B-20.

$n + t = ht$

Ex: kukuhunan + tsakya =
kukuhunahtsakya 'stuck in the ground'

B-21.

$n + k = hk$

Ex: ahunan + ki =
ahunahki 'hoes'

B-22.

$n + ? = h?$

Ex: kusan + ?atsiu =
kusah?atsiu 'house grass'

Bucca's three rules may be conflated provisionally into the following rule:

PR-3: H-FORMATION (Preliminary Formulation)

$$n \rightarrow h / \text{---} \left[\begin{array}{l} -\text{cont} \\ -\text{del. rel} \\ -\text{nas} \end{array} \right]$$

Additional empirical support for Bucca's Rule B-21 above is provided by forms not cited by him, but attested in our corpus. In the following derivations (a-1) and (a-2), stem-final n precedes a

vowel, and remains n-. In (a-3), however, stem-final n precedes a consonant. Consider the following forms:

(a-1)

/ # a- + hanuk # / (Indef./Dur. + Stem)
 ahanok ' (3 sg) plants'

(a-2)

/ # a- + han + ik + -un + -u # / (Indef./Dur. + Stem + (?)
 + Loc. + Abs.)
 ahanikonu 'where field (the plantings)
 is'

(a-3)

/ # a- + han + k + -u + -ki # / (Indef./Dur. + Stem + (?)
 + Abs. + pl)
 ahahko:ki 'the planted (things)'

In the preceding, it appears reasonable to posit han as the verb stem 'plant'. (The segments ik in (a-2) and the segment k in (a-3) are not analyzable at present.) In any case, the conversion in (a-3) of stem-final n to h when n precedes the stop k appears to result from the application of Bucca's Rule B-21.

Bucca's Rule B-20 likewise appears to find independent empirical support in our attested forms. Observe here in (b) that the stem-final n of ratkan 'darkness' is preserved prevocalically:

(b)

UR / # ri- + ratkan + -un + -u # / (Pot. + Stem + Loc. + Abs.)
 SR niratkanonu 'more dark there is'¹

By contrast, in (c) below, the identical stem-final n is converted to h before the stop t:

(c)

| | |
|----------------------------|--|
| UR / # ratkan + taktes # / | (Stem 'darkness' + <u>taktes</u> 'in center') |
| SR natkahtaktes | 'middle darkness' |

Bucca's Rule B-22 attempts to account for the alternation of n with h when n precedes glottal stop, and cites in evidence:

kusan + ?a(c)iu = kusah?a(c)iu 'house grass'

to which we are able to bring as supporting evidence only the following form:

(d)

nah?iru 'youngest'²

It should be noted, however, that Bucca's Rule B-20 is not really analogous to his Rules B-21 and B-22. The latter two claim, correctly, that n converts to h before a stop. His Rule B-20, on the other hand, assumes (in the base form kukuhunan + tsakya 'stuck in the ground') that the n becomes h before the t of the following sequence ts, thereby claiming that the sequence ts is bisegmental, with the initial t providing the alveolar counterpart to the stops k and ʔ. We have argued above (Chapter 3) that t^s ought to be represented as c.

Consequently, by our analysis, Bucca's Rule B-20 provides independent evidence for our claim that underlying phonological n is converted to surface phonetic h not only before the stops t, k, and ʔ, but also before the affricate c.

We therefore propose that our earlier formulation of H-FORMATION (PR-3) be modified to reflect this expanded generalization, taking its final form as:

PR-3: H-FORMATION

$$n \rightarrow h / \text{---} \left[\begin{array}{l} -\text{syll} \\ -\text{son} \\ +\text{cons} \\ -\text{cont} \end{array} \right]$$

The application of VOWEL LOWERING (PR-1), N-FORMATION (PR-2), and H-FORMATION (PR-3) are shown in the following:

(e)

| | |
|----------------------------|--------------------------------|
| | VOWEL LOWERING |
| UR / # ratkan + taktes # / | / # ri + ratkan + -un + -u # / |
| | / # ri + ratkan + -on + -u # / |
| | N-FORMATION |
| / # natkan + taktes # / | / # ni + ratkan + -on + -u # / |
| | H-FORMATION |
| / # natkah + taktes # / | |
| SR natkahtaktes | niratkanonu |
| 'middle darkness' | 'more dark there is' |

None of these three rules interact for these forms and are, therefore, unordered.

On the basis of the evidence, our rule of H-FORMATION, by which underlying n is converted to surface h before non-spirant obstruents appears to be plausible.

NOTES TO CHAPTER 6.

1

Our rules N-FORMATION (PR-2) and VOWEL LOWERING (PR-1) automatically convert certain r to n and u to o, respectively.

2

The status of this form (d) is ambiguous because H-FORMATION (PR-3) creates a neutralization with respect to genuine h clusters: the segment underlying h in this form could be either n or h.

7. SEGMENTAL DEVOICING

In addition to n, a second nasal resonant is indicated in the texts, although attested only a handful of times. This is "aspirated" n^h, which occurs, as does n, word-initially and intervocalically, as in these following forms:

(a)

| | |
|---------------------------------------|--------------------------------|
| n ^h un ^h ea:ta | '(3 sg) gives them in hand to' |
| nyun ^h anayata | 'they (pl) foot-race' |
| n ^h un ^h ahe:yu | 'difficult thing for him' |
| n ^h un ^h ana | '(3 sg) gambles' |
| n ^h un ^h ok | '(3 sg) does it' |

However, alternants to several forms in (a) above are also attested, in which the n^h has been replaced by n without apparent change of meaning; consider the following forms:

(b)

| | |
|---|---------------------------|
| n ^h un ^h ahe:yu / nunahe:yu | 'difficult thing for him' |
| n ^h un ^h ana / nunana | '(3 sg) gambles' |
| n ^h un ^h ok / n ^h on ^h ok / nonok | '(3 sg) does it (for)' |

The absence of semantic differences between these alternants leads one to consider n and n^h non-distinctive alternations. This is in fact how Bucca sees the matter (1969:10-11); while Chomsky and Halle observe that a contrast between voiced and voiceless nasals is attested, but rare (1968:316).

In view of the small number of distinctive segments in the phonetic inventories of Caddoan languages, a possible contrast of these segments in Kitsai, although improbable, should not be ruled out altogether. On the other hand, evidence for distinctiveness is lacking.

A similar situation is encountered with respect to the segment w, which parallels n in also having an apparent "aspirated" alternate in w^h. However, the greater number of attested forms in w^h provides a somewhat firmer basis for a conclusion.

Like n, w occurs word-initially and intervocalically:

(c)

| | |
|--------|-----------------|
| wanyuk | 'is like' |
| wasas | 'Osage' |
| awana | '(3 pl) go' |
| awita | '(3 sg) wears' |
| awicko | '(3 sg) thinks' |

Forms in w^h are also attested in intervocalic and postconsonantal position, but we believe that this probably reflects free variation.

This variation can be seen in the following forms:

(d)

| | |
|---------------------------------|---|
| aw ^h i | '(3 sg) dwells/sits/grows' |
| anayaok ^h nahyonaiwi | '(3 sg) there along with children dwells' |
| akosaw ^h i | '(3 sg) house sits' |
| anaw ^h i | '(3 sg) there dwells' |
| arahka:w ^h i | '(pl) sit inside' |
| arahka:wi | ' " " " ' |

| | |
|--------------------------------|----------------------------------|
| atkatawi | '(3 sg) sits at fire's edge' |
| kwanarahka:w ^h ia | 'who therein/inside sat (pl)' |
| kwanarahka:wia | ' " " " " ' |
| neninohkosaw ^h ionu | 'where their (pl) house sits' |
| ayakwionu | 'where wood (= 'tree'?) sits' |
| kokoyakwia | 'where wood (" " ") sat (Evid.)' |

In these forms above, the alternation between w^hi and wi is clearly non-distinctive, and the morphological evidence does not permit a firm decision with respect to other surface appearances of w. For example, the presence or absence of the Distributive Suffix -wa does not shed much additional light on the problem, as shown by the following forms:

(e)

| | |
|---------------------------|---------------------------------|
| nyotawa?a | 'they (pl) bathe' |
| nyotawawa | 'they (pl) bathe' (+ Dist. -wa) |
| niwa:a | 'they (pl) eat' |
| niw ^h awa:wa?a | 'they (pl) eat' (+ Dist. -wa) |

The most prudent conclusion is probably that some surface phonetic occurrences of intervocalic w are evidently w^h, while some of the surface occurrences of w may be --- and probably are --- merely w. In any case, the respective status of w and w^h with regard to distinctiveness must remain indeterminate. The same holds for the respective surface phonetic occurrences of n and n^h.

More importantly, (and apart from the issue of distinctiveness), the textual phonetic representation of n^h and w^h as "aspirates" tends to obscure the fact that these segments probably represent voiceless counterparts to the voiced segments n and w.

We therefore suggest that the phonological grammar of Kitsai includes a rule which devoices both n and w in some as-yet-unspecifiable environment. That this environment must be specified as other than merely intervocalic is clear from forms already given, and from the following additional examples:

(f)

| | |
|--|--|
| nihyahyow ^h aw ^h a:t | 'they (pl) spread-about-(Dist.)- there' (i.e., 'butcher') |
| nihyunuwaw ^h a:tira | 'they chase round-about (surround)' |
| neyakihi:aw ^h a?a | 'himself disgorges water' |

We therefore formulate this rule, however tentatively, as follows:

PR-4: RESONANT DEVOICING

$$\begin{bmatrix} n \\ w \end{bmatrix} \rightarrow [-vce] / \text{ISC}$$

The following derivations illustrate the rule of RESONANT DEVOICING (PR-4):

| | | |
|----|------------------|------------------------|
| UR | / # ru + nuk # / | (Obj. + Verb Stem) |
| | / # nu + nuk # / | N-FORMATION |
| | / # no + nok # / | VOWEL LOWERING |
| | / # No + Nok # / | RESONANT DEVOICING |
| SR | NoNok | '(3 sg) does it (for)' |

| | |
|------------------------|-------------------------------|
| UR / # an + a + wi # / | (Loc. + Ind/Dur. + Verb Stem) |
| / # an + a + Wi # / | RESONANT DEVOICING |
| SR anaWI | '(3 sg) sits there' |

(ii)

Of the three stop consonants in Kitsai, only k is aspirated; the other stops, t and ʔ, are subject to other phonological processes.

The segment k is frequently aspirated when followed by certain consonants, i.e., t, n, and s. Consider the following forms:

(g)

| | |
|------------------------------------|-------------------------------------|
| niyasak ^h tira | 'they (pl) hunt round about' |
| awak ^h tek ^h | '(it) hoots' |
| isterak ^h nayoku | 'let us (pl in) go in' |
| ayaok ^h nahyonaiwi | '(3 sg) along with-children dwells' |
| sicihoyak ^h sahcko | 'let us (du in) go seek him' |
| ickinanirahyok ^h sata | 'that's all things made' |

The segment k, on the other hand, does not aspirate before the semi-vowels y and w; witness the forms:

(h)

| | |
|----------------|-------------------------|
| isnakwihu | 'you (pl) go after!' |
| niyakwawi:na | 'they hunger them (pl)' |
| kokowakokya | '(3 sg) said' |
| kokwawacitikya | '(3 sg) exited' |

But k is also observed to aspirate before the affricate c, although the sequence k + c is rare in Kitsai, and is at present attested only once, in the form:

(i)

| | |
|------------------------|----------|
| ya?ok ^h cki | 'infant' |
|------------------------|----------|

Finally, k is observed to aspirate word-finally, as in the following forms:

(j)

| | |
|------------------------------------|-----------------------------|
| nutasnayanikok ^h | '(3 sg) grasps him by feet' |
| ateawarik ^h | '(3 sg) tires' |
| nucikiyask ^h | 'water mixes with it' |
| awak ^h tek ^h | '(3 sg) [owl] hoots' |
| ariskonyuk ^h | 'one is there' |
| nihkareawatk ^h | 'they spread them (pl)' |

The aspiration of k preceding another k is automatically precluded by a sequential constraint on geminate consonant clusters, such that the cluster kk never appears in surface structure; this constraint is motivated later below (Chapter 10).

Similarly, the sequence kr never occurs in surface structure, but is automatically converted by rule (PR-2) to kn, only after which aspiration applies.

In Kitsai, surface phonetic palatalization is restricted to the segment t. As shown by the following forms, t becomes palatalized when followed by k:

(k)

| | |
|---------------------------------|-----------------------------------|
| nat ^y kwiruwawani:su | ' "is head all-over scratched?" ' |
| ickorahonit ^y kwi | 'is well settled to sleep' |
| at ^y karahkos | 'hears' |
| nirat ^y kyena | 'dark becomes' |
| nut ^y kirico:hu | 'waters him repeatedly' |

and also word finally:

(1)

| | |
|-----------------------------------|---|
| kawit ^y | 'ere this, long ago' |
| nya?oht ^y | 'ragweed' |
| yat ^y kat ^y | 'after' |
| akariat ^y | 'spread (inside)' |
| ni:kayrat ^y | 'they (pl) sate themselves' |
| nihyahowawa:t ^y | 'they (pl) spread-about (= 'butcher') there' |

Although word-final t is not always transcribed as t^y, palatalization in any case is not believed to be distinctive in Kitsai, as indicated by the following:

(m)

| | |
|-----------------------------------|-----------------------------|
| yat ^y kat ^y | 'after' |
| yat ^y kat | 'behind' |
| ni:kayrat ^y | 'they (pl) sate themselves' |
| nikayrawa:t | 'they (pl) finish plenty' |

(where the additional element -wa is the Distributive Suffix.)

However, the vast majority of word final t are transcribed as palatalized. We are therefore without any evidence that palatalization is distinctive for the language.

Palatalization of t when followed by n is attested only once, in the form:

(n)

| | |
|--------------------------------|--------------------------------|
| nahkokwaht ^y nakawe | 'painted-red come toward them' |
|--------------------------------|--------------------------------|

In the preceding discussion of apparent consonant aspiration and palatalization processes, we have purposely emphasized the tentative nature of our observations concerning these phenomena. The reason for this is as follows.

We believe that it is not only possible, but also in fact quite likely, that "aspiration" and "palatalization", as attested in the phonetic representation of the texts, are not phonological processes of Kitsai at all. We have already stated above that the "aspirated" segments n^h and w^h are believed to represent devoiced counterparts to the voiced segments n and w. We believe that a similar situation holds with regard to the "aspirated" and "palatalized" stops, k^h and t^y, respectively.

A number of Kitsai forms are attested which evidently represent vowel-final variants of forms in final "aspirated" k. Consider the following forms and their variant shapes:

(o)

| | |
|------------------------|---------------------------|
| warasnyuk ^h | 'bad is' |
| warasnyuku | |
| ikwasik ^h | 'thus you (sg) are' |
| ikwanasiku | 'maybe thus you (sg) are' |
| ok ^h | |
| uk ^h | 'is' |
| kanyok ^h | 'is not' |
| ka?anyoku | 'may not be' |

These forms above do not exhaust the total number of forms which could be cited as examples.

An analogous situation is indicated with respect to "palatalized" t, although the number of forms exhibiting the pertinent variation is much smaller. Consider the following forms:

(p)

| | |
|--------------------------|---------------------------|
| sakorahonat ^y | 'be lost us' |
| | (du + Obj. + Stem) |
| sasakorahonatu | 'will be lost us' |
| | (du + Fut. + Obj. + Stem) |

While it is not clear from this one set of forms that only forms in word-final -tu # may take the variant -t^y, we nonetheless maintain that the forms in (p) above, along with the evidence of forms such as those cited in preceding sets, reasonably suggest positing a rule of vowel-devoicing in Kitsai.

The choice of the respective underlying vowels to undergo devoicing is not altogether clear. The general pattern of free variation (-k^h / -ku) in the forms with final k^h cited above suggest that the underlying vowel in these variants should be / -u / :

/ k + u /

Positing / u / as the underlying vowel after k in these forms is supported by other forms, such as the following:

(q)

| | |
|------------------------|--|
| arahkosik ^h | '(3 sg) picks them up' |
| | (Ind/Dur. + Obj. + pl + Stem: <u>kusik</u>) |

isnakosiku

'you (pl) pick up!'

(Imp. + 2p. + pl + Stem:kusik)

It is also tempting to posit i as the underlying vowel following t, because of the naturalness of t palatalizing before a high front vowel. The morphological evidence needed to resolve the issue is, however, lacking. The set of forms in (p) above represents the only evidence which might support a view that the "palatalized" t could have underlying u in the k-final forms, rather than i.

We conclude this section by summarizing our position at present. First, it is apparent that the segments n and w are subject to devoicing in as yet unspecifiable contexts by a process represented by our RESONANT DEVOICING rule (PR-4), which produces the devoiced counterparts n^h and w^h, hereafter transcribed as N and W, respectively.

Second, it is suggested that the attested forms in "aspirated k" (k^h) and in "palatalized t" (t^y) in fact represent neither aspiration nor palatalization processes, but rather the phonetic result of the voiceless stops k and t followed by a devoiced vowel, which in most of the cited forms in k + V is probably underlying u. The choice of the underlying vowel for the forms in penultimate t is not as clear, but the vowel is thought to be a high vowel, either u as in (p) above, or i, which might better explain the tendency to hear these as "palatalized".

The following table indicates the correspondences which are believed to hold among the pertinent segments.

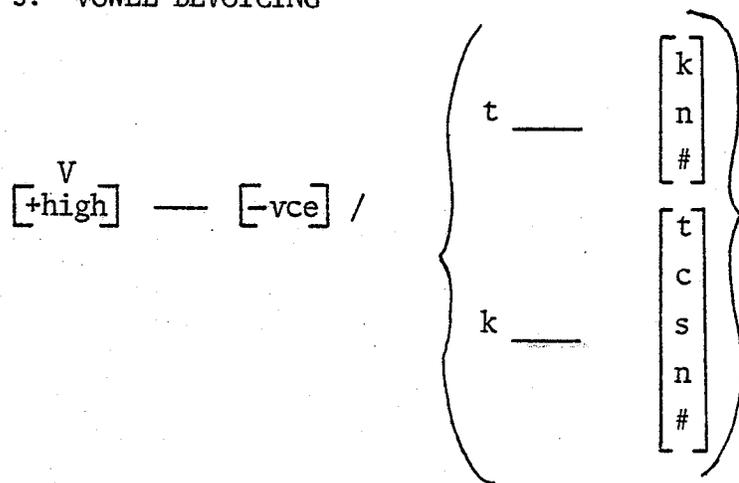
Table 9.

Devoiced Segments

| | | |
|---|---|------------------------|
| Attested: \underline{n}^h | = | \underline{N} (-vce) |
| \underline{w}^h | = | \underline{W} (-vce) |
| \underline{t}^y ($\underline{t} + \underline{u/i}$ (-vce)) | = | \underline{tU} |
| \underline{k}^h ($\underline{k} + \underline{u}$ (-vce)) | = | \underline{kU} |

We therefore posit the following rule to account for the vowel devoicing processes discussed in the preceding pages:

PR-5: VOWEL DEVOICING



8. GLIDE FORMATION: 1

The phonological status of y and its relation to i is somewhat problematic. Bucca maintains y as a separate phoneme (1969:9). We believe it is possible to show that at least certain appearances of y are probably best regarded as surface manifestations of underlying i.

First, it will be observed that both i and y are potentially distinctive in word-initial position, although their respective environments otherwise differ:

(a)

Environment: # ____

| | |
|----------|--------------|
| ikoko | 'that is' |
| i?yaniki | 'brother' |
| ?ya?yo | 'enough' |
| yahena | ' "go on!" ' |

The "potential distinctiveness" referred to here pertains only to a word-initial environment as such; a clear-cut minimal pair distinguishing i and y has yet to be found.

Elsewhere, their respective environments are mutually exclusive, and the relation of the two segments is complementary:

(b)

Environment: ____ #

| <u>i</u> | | <u>y</u> |
|-------------|-------------------|----------|
| arahkwatiki | '(pl) are bloody' | --- |
| nutatka:wi | 'bluff sits' | --- |
| kahcnu:ki | 'white are' | |

(c)

Environment: V__V

i

y

a:kayu 'moving about
scattered'

kayako 'mature is'

oyatanu 'town is'

(d)

Environment: C__C

i

y

kaniri:tawi '(3 sg) knows not' ---

ahiriwa:wi '(3 sg) sets heaped up'

hiwi?it 'skunk'

Moreover, it is clear from morphological evidence that a predictable alternation of i with y results when certain verb stems take the Evidential Suffix, which in underlying form is posited as / -ia # /. (Because the morphology of the Evidential includes both prefixes and suffixes, we have cited here only verb stems in order to illustrate the suffixation. A fuller discussion of the morphology of the Evidential is found in Chapter 11 below.) Note the stem-final alternations in these forms:

Stem + Evidential Suffix / -ia /

(e)

| | | | |
|----------------------|---|------------------|-----------------------|
| / ucikstawati + ia / | → | / ucikstawatya / | 'unhand' |
| / raw:aki + -ia / | → | / rawa:kya / | 'time extend' |
| / wanas + -ia / | → | / wanasya / | 'make/cook (meat)' |
| / kirikan + -ia / | → | / kirikanya / | 'awaken' |

Forms in stem-final wi, however, do not undergo the alternation:

(f)

| | | | |
|-----------------------|---|------------------|----------------------|
| / ...rahka:wi + -ia / | → | / ...rahka:wia / | 'sit inside' |
| / ...konitkwi + -ia / | → | / ...konitkwia / | 'settle to sleep' |

Similarly, forms in r + -ia preserve the i.

(g)

| | | | |
|-----------------------------|---|-----------------|-----------------|
| / ...ucir(a) + <u>-ia</u> / | → | / ...uciriaha / | 'things happen' |
|-----------------------------|---|-----------------|-----------------|

The same pattern appears to hold for non-evidential forms in the sequence ri + V and wi + V:

(h)

| | |
|------------|----------------------------|
| acariacu | 'she is pregnant' |
| iriasu | 'first' |
| witiwa:wiu | 'who (pl) are dwelling' |
| ayakwionu | 'where wood sits (=tree?)' |

The alternations of forms in (e) through (h) above may be summarized as follows:

Table 10

| Evidential Suffix (-ia #) Alternations | | |
|--|---|--------|
| ti + -(i)a | → | -tya # |
| ki + -(i)a | → | -kya # |
| c(i) + -ia | → | -cya # |
| s + -ia | → | -sya # |
| n(a) + -ia | → | -nya # |
| But: | | |
| r + -ia | → | -ria # |
| w + -ia | → | -wia # |

(The additional i, indicated (i) above, is automatically deleted by rule, in compliance with the geminate cluster constraint.)

The following forms show the occurrence of y when preceded by ʔ and h:

(i)

karoʔyas 'turkey'

iʔyaniki 'brother'

ʔyaʔyo 'enough'

(j-1)

(ka)sinihona:s 'is (not) found by (sg)'

(j-2)

sinihyona:s 'is found by (pl)'

In the above forms (j-1) and (j-2), the hy results from an underlying plural morpheme, i, which is then converted by rule to hy.

The following rule is tentatively posited to account for Glide

Formation:

GLIDE FORMATION (PROVISIONAL)

$$i \rightarrow y / \begin{array}{|c} t \\ k \\ ? \\ h \\ c \\ s \\ n \\ \# \end{array} \quad \underline{\quad} V$$

Other surface phonetic appearances of y , in which y appears before a consonant, are also believed to derive from underlying i . The following derivations show the conversion of underlying i to y when i is followed by certain consonants. The choice of i as the underlying segment is not a principled one.

(k) 1.

| | | |
|----|-------------------------------------|--|
| UR | / # kuku- + rai- + tkwiuk + -ia # / | (Evid. Pref. + 3 pl Obj. + Stem + Evid. Suff.) |
| | / # koko- + rai- + tkwiok + -ia # / | VOWEL LOWERING |
| | / # koko- + ray + tkwiok + -ya # / | GLIDE FORMATION |
| SR | kokoraytkwiokya | '(3 sg) unspitted them' |

2.

| | | |
|----|------------------------------------|---|
| UR | / # ka- + iku- + isi + waku:ku # / | (Neg. + 'thus' + 2p. Imp. + Stem: 'speak') |
| | / # ka- + ikw- + isi + wako:ku # / | VOWEL LOWERING |
| SR | kaykwisiwako:ku | ' "don't be speaking thus"! ' |

3.

| | |
|--------------------------------------|---|
| UR / # ku + ya + ku + rai + ?aha # / | (Evid. Pref. + 3pl Obj. + Stem + Evid. Suff.) |
| / # ku + ya + ku + ray + ?aha # / | GLIDE FORMATION |
| / # ko + ya + ko + ray + ?aha # / | VOWEL LOWERING |
| SR koyakoray?aha | '(pl) came with in hand' |

4.

| | |
|----------------------------------|---------------------------|
| UR / # ri- + rai- + cuya:rik # / | (Pot. + 3 pl Obj. + Stem) |
| / # ni- + rai- + cuya:rik # / | N-FORMATION |
| / # ni- + ray- + cuya:rik # / | GLIDE FORMATION |
| SR niraycuya:rik | '(3 sg) distributes them' |

Although direct morphological evidence is lacking, the sequence vowel + glide + consonant in the following forms is believed to result from GLIDE FORMATION as well:

5.

| | |
|-----------------------|------------------------------------|
| ikonyonayru | 'thus they (pl) intend' |
| nikayrawa:t | 'they (pl) finish plenty' |
| sinucirayhkatawi:tik | 'they (du) speaking sit down upon' |
| kosyakorayna?uhkataha | 'they (du) come upward among' |

Forms cited above show the alternation of underlying i to surface y before these consonants: t, k, ʔ, c, s, n, and r. The conversion of underlying i to y after another y is precluded by the constraint on geminate clusters. The segment w, however, is problematic. It appears that i, if stressed, is preserved between a vowel and a following w, as shown by this form:

(1-1)

/ a- + ya?ok + nahyo + nai + wi / (Indef./Dur. + 'child' +
'along with (?)' + (?) +
Verb Stem: 'dwell')

aya?oknahyonaiwi '(3 sg) along with children
dwells'

whereas in (1-2), the unstressed i seems to be subject to GLIDE

FORMATION:

(1-2)

/ # an- + a- + rai- + wi:ca # / (Loc. + Indef./Dur. +
3 pl Obj. + Stem: wi:ca)

anaraywi:ca 'there arrive-come with them
(pl)'

Despite the surface appearance of ...ai # in forms such as:

| | |
|---------|---------------------|
| kotai | 'corn' |
| nei | 'and/but' |
| acai | 'so then' |
| kani?ai | '"well, let's see"' |

there does not appear to be any reason to require that the rule also
apply before word boundary to produce ay #.

We therefore formulate GLIDE FORMATION in its final form as follows:

PR-6: GLIDE FORMATION

$$i \rightarrow y / \left\{ \begin{array}{l} \# \quad \text{---} \quad [+ \text{syll}] \\ \left[\begin{array}{l} -\text{syll} \\ -\text{cons} \end{array} \right] \quad \longleftrightarrow \quad [+ \text{syll}] \\ [+ \text{syll}] \quad \text{---} \quad w \end{array} \right. \left. \begin{array}{l} \\ \\ [-\text{stress}] \end{array} \right\}$$

(Where \longleftrightarrow = 'mirror image')

However, we believe that Bucca's analysis may be incorrect, and that at least some occurrences of hy which appear to result from his rule (B-4) in fact represent the output of our GLIDE FORMATION rule (PR-6). Consider these forms, in which the Passive/Instrumental Prefix sinih- has been affixed to certain transitive verb stems:

(b)

| | |
|-------------------|--------------------------------|
| sinihyona:s | 'is found by (pl)' |
| sinihyoyaksa | 'is sought by (pl)' |
| sinihyoyaksahcata | 'is gone after sought by (pl)' |

If Bucca's analysis is correct, the hy sequences in the above forms ought to result from hh + V, where V is neither [+ high] nor [+ front], i.e., not i. That is to say, these forms ought to be derived from the following underlying representations:

(c)

| | | |
|---------------|---|--|
| <u>sinih-</u> | + | $\left\{ \begin{array}{l} \text{huna:s} \\ \text{huyaksa} \\ \text{huyaksahcata} \end{array} \right\}$ |
|---------------|---|--|

In fact, however, it can be shown that the forms in (c) are not the underlying representations for the forms in (b) above.

Notice first of all that sinih- may be affixed to the stem huna:s, 'find', without triggering Bucca's rule B-4. That this is so is apparent when the subject is singular and the Negative Prefix ka- is optionally present, as in the form:

(d)

| | | |
|----|---------------------------------|------------------------|
| UR | / # (ka-) + sinih- + huna:s # / | (Neg.) + Pass. + Stem) |
| SR | kasinihona:s | 'is not found by (sg)' |

On the other hand, that the stem is properly represented in underlying form by huna:s is clear from related forms such as:

(e)

| | | |
|----|--------------------------------|-------------------------------------|
| UR | / ka- + s- + ati- + huna:s / | (Neg. + Dual + lp. + Stem) |
| SR | kasatihona:s | 'we (du ex) find him not' |
| UR | / ta- + sa= + huna + wa: + s / | (Recip. + du + Stem + Dist. + Stem) |
| SR | tasahonawa:s | '(du) find one another' |

In the second form, the Distributive Suffix -wa is infixes into the Stem huna:s to form hunawa:s. In all examples above, the underlying u automatically converts to o by VOWEL LOWERING (PR-1).

Furthermore, it is also clear that the Passive/Instrumental Prefix ought to be represented in underlying form as sinih-, on the basis of forms such as the following, in which the prefix is joined to the verb stem caki, 'shoot/strike/strike- $\&$ -kill', as in:

(f)

| | | |
|----|-----------------------|-----------------------|
| UR | / # sinih- + caki # / | (Pass./Instr. + Stem) |
| SR | sinihcak | 'is shot by' |

How, then, are we to account for the failure of the form kasinihona:s 'is not found by (sg)' to undergo Bucca's rule B-4 and be automatically converted to the ill-formed *kasinihyona:s?

If we examine the forms in (b) above, we observe that the subjects of these forms are all in third person plural, and also that the second and third forms in (b) are derived from the verb stem huyaksa, 'seek/look for', which, like huna:s, 'find', appears in surface phonetic representation without (h)h + (o) being converted automatically to hy.

Consider the following forms:

(g)

| | |
|-------------------------|--------------------|
| UR / # a- + huyaksa # / | (Dur./Ind. + Stem) |
| SR ahoyaksa | '(3 sg) seeks' |

(h)

| | |
|----------------------------|------------------------|
| UR / # yaku- + huyaksa # / | (Inf. + Stem) |
| SR yakohoyaksa | 'to seek' (Infinitive) |

(i)

| | |
|---|----------------------------------|
| UR / # s- + ici- + huyaksa + ahcku # / | (du in + Hort. + Obj. + Stem) |
| SR sicihoyaksahcko | 'let us (du in) go seek him' |

In our view, the analysis which best accounts for the surface phonetic appearance of hy in the forms in (b) above is one which recognizes the presence of an additional morpheme, Plural (probably represented by i) in the underlying representation of forms in surface hy. According to this analysis, the presence of ho and hyo in various sets of forms are then accounted for in a systematic fashion as resulting automatically from the application of our GLIDE FORMATION rule to the third person plural forms in underlying i, and not to those third person singular forms in which the underlying plural morpheme i is absent. While the morphology of some third person plural forms is not yet fully understood, the underlying plural morpheme can be observed in other sets of forms as well. Consider the following:

(j)

| | |
|---------------------------|--------------------------|
| UR / # ka- + nehayaki # / | (Neg. + Stem) |
| SR kanehayaki | '(3 sg) understands not' |

(k)

UR / # ka- + n + i + ehayaki # / (Neg. + pl + Stem)
 SR kanyehayaki '(3 pl) understand not'

and also:

(l)

UR / # a- + wak + u # / (Ind/Dur. + Stem + Abs.)
 SR awako '(3 sg) says'

(m)

UR / # a- + wak + i + u # / (Ind/Dur. + Stem + pl + Abs.)
 SR awakyu 'they (pl) say'

and also the Evidentials of these same forms:

(n)

UR / # kuku- + wak + u + k + ia # / (Evid. + Stem + Abs. + (?) +
 Evid.)
 SR kokowakokya '(3 sg) said'

(o)

UR / # kuku- + wak + i + u + k + (Evid. + Stem + pl + Abs. +
 ia # / (?) + Evid.)
 SR kokoyakyokya '(3 pl) said'

By positing an additional morpheme plural having the tentative underlying shape i, the appearance of hy in the forms in (b) above can be accounted for systematically through the application of GLIDE FORMATION and GEMINATE REDUCTION (to be motivated elsewhere here):

UR / # sinih- + h + i + una:s # / (Pass./Inst. + Stem + pl +
 Stem)
 / # sinih- + i + una:s # / GEMINATE REDUCTION

| | | |
|----|---|---|
| | / # sinih- + y + una:s # / | GLIDE FORMATION |
| | / # sinih- + y + ona:s # / | VOWEL LOWERING |
| SR | sinihyona:s | '(3 sg) is found by pl)' |
| UR | / # sinih- + h + i + uyaksa # / | (Pass./Inst. + Stem + pl + Stem) |
| | / # sinih- + ø + i + uyaksa # / | GEMINATE REDUCTION |
| | / # sinih- + y + uyaksa # / | GLIDE FORMATION |
| | / # sinih- + y + oyaksa # / | VOWEL LOWERING |
| SR | sinihyoyaksa | '(3 sg) is sought by (pl)' |
| UR | / # sinih- + h + i + uyaks + ahc + ata # / | (Pass./Inst. + Stem + pl + Stem + Stem: 'go') |
| | / # sinih- + ø + i + uyaks + ahc + ata # / | GEMINATE REDUCTION |
| | / # sinih- + y + uyaks + ahc + ata # / | GLIDE FORMATION |
| | / # sinih- + y + oyaks + ahc + ata # / | VOWEL LOWERING |
| SR | sinihyoyaksahcata | '(3 sg) is gone after sought by (pl)' |

Furthermore, one of Bucca's own examples (in his B-4) which is cited by him in the plural, also has a form in the singular which appears to support our analysis rather than his. Consider the following:

(p)

| | |
|----------------------------|----------------------------|
| nih + hunayak = nihyonayak | 'they (pl) dance' (Bucca) |
| a + hunayak = ahunayak | '(3 sg) dances' (our form) |

In our analysis, Bucca's form above would have the underlying representation:

(q)

UR / # rih- + h + i + unayak # /

in order to take into account the plural morpheme i proposed by us in the underlying representation.

(r) If we consider the pair

(ka)sinihona:s 'is (not) found by (3 sg)'

sinihyona:s 'is found by (3 pl)'

it seems that the respective absence and presence of the morpheme plural, with the underlying shape i, is sufficient to account for the corresponding absence and presence, respectively, of ho and hyo.

However, it appears to be clear that Bucca's rule (B-4) cannot automatically account for the systematic alternation of ho and hyo in these and other sets of forms, whereas positing the additional plural morpheme i in underlying representation, and the subsequent application of GLIDE FORMATION, accounts neatly for the alternation.

In summary, it is held that the alternation of ho with hyo in certain forms can best be accounted for by assuming these underlying representations, respectively: / # h + u # / (sg) and / # h + i (pl) + u # /. Actually, of course, by the rules so far presented here, we have produced superficial **hho and *hhyo because we have not formally provided for deletion of one member of the disallowed surface geminate cluster *hh resulting from the underlying representation. (We have handled this informally by referring to GEMINATE REDUCTION.) Bucca posits an additional rule (B-5) as a complement to his (B-4), which

takes the form:

B-5.

$h + hi = hi$ (i.e., $h + hV$ where $V = [+ high]$, $[+ front]$)

Ex:

arah + hi:tkusk = arahi:tkusk 'puts in water on
fire (pl)'

Bucca's rule, however, refers specifically to the sequence *hh, which it is unnecessary to do, in view of our GEMINATE CLUSTER CONSTRAINT.

By means of derivations, we shall attempt to show that positing the underlying plural morpheme i, and the subsequent application of our GLIDE FORMATION, GEMINATE REDUCTION, and VOWEL LOWERING rules provide a systematic account of the phenomena which Bucca handles by discrete, segment-specific rules. The forms to be derived are the pair kasinihona:s and sinihyona:s, which differ only in the respective absence and presence of the underlying plural morpheme i, and trivially by the optional presence in the former of the Negative Prefix ka-.

| | | |
|----|--|--------------------------|
| UR | / # (ka) + sinih + h + una:s # / | |
| | / # (ka) + sinih + \emptyset + una:s # / | GEMINATE REDUCTION |
| | / # (ka) + sinih + \emptyset + ona:s # / | VOWEL LOWERING |
| SR | kasinihona:s | 'is not found by (3 sg)' |
| UR | / # sinih + h + i + una:s # / | |
| | / # sinih + \emptyset + i + una:s # / | GEMINATE REDUCTION |
| | / # sinih + \emptyset + i + ona:s # / | VOWEL LOWERING |
| | / # sinih + \emptyset + y + ona:s # / | GLIDE FORMATION |
| SR | sinihyona:s | 'is found by (3 pl)' |

In the absence of any indication that VOWEL LOWERING, GLIDE FORMATION, and GEMINATE REDUCTION are ordered rules, their application here has been ordered in an arbitrary manner.

10. GEMINATE CLUSTER REDUCTION

In Kitsai, certain consonant clusters which are permitted in the underlying phonological representations of forms never in fact appear in the surface phonetic representations of those forms. It can be shown that such clusters, which are phonologically well-formed but phonetically ill-formed, are rendered phonetically well-formed by various phonological rules. Some rules which have this effect have already been motivated elsewhere in this paper. Morphological analysis of the texts utilized for this study (Parks 1977) will not support a comprehensive elucidation of these rules, which in any case lies beyond the scope of this essay.

We shall attempt here to provide empirical support for motivation of a sequential constraint on the surface phonetic representations of underlying geminate obstruent consonant clusters. This constraint on geminate clusters is held to apply to all phonological segments in the language, including sonorants and vowels as well. If valid, it would constitute a general structural principle of Kitsai phonology, and therefore a major linguistically significant generalization concerning the grammar of Kitsai. In keeping within the scope of this study, however, our discussion of this constraint will be limited to the obstruent segments.

We have termed this proposed surface structure constraint the Geminate Cluster Constraint, and formulate it as follows:

SURFACE STRUCTURE CONSTRAINT ON GEMINATE OBSTRUENT CLUSTERS:

* C_iC_j

- conditions: 1. where C = (-son)
2. where i = j

Empirical support for this constraint will be drawn from the Lesser texts in Parks (1977), supplemented by some additional forms cited by Bucca (1969), together with some rules proposed by him. Bucca's material is used here as elsewhere to provide supplementary empirical data, to fill lacunae, and to provide partial confirmation of our analysis.

We shall proceed systematically through the obstruent series. It will be recalled that the Kitsai phonetic inventory lacks labial obstruents altogether; we therefore begin with the dental stop t. In no Kitsai form does t occur in the surface representation as a geminate cluster, i.e., as *tt. Bucca cites and analyses two forms, on which basis he posits his rule B-1 (Bucca 1969:17), which we present here as follows:

B-1:

t + t = (c)t

| | |
|--------------------------|------------|
| Ex: at + taruk = actaruk | 'I gather' |
| at + taki = actaki | 'I scrape' |

The process described above, which should probably be regarded as affrication, seems to be supported by the following attested form:

(a)

UR / # a- + takic + tarok # / (Indef./Dur. + (?) + Stem:
'pluck/gather')

SR atakictarok '(3 sg) takes off water-
bucket'

Compare, however, (b) with (a):

(b)

UR / # a- + rah- + yas + tarok # / (Ind./Dur. + pl + (?) + Stem:
'pluck/gather')

SR arahyastarok '(3 sg) takes away ropes'

In (a) above, the sequence ct may represent the output of Bucca's rule; at least it is clear that the second element t forms the initial segment of the stem taruk 'pluck/gather'. The underlying form of the preceding c is unclear, but if it is an underlying t, then this form (a) above confirms Bucca's analysis.

However, an interesting form with respect to this question is:

(c)

SR suhctarawa:tu 'if you are industrious'

which requires to be analyzed in underlying form as:

UR / # suhc- + tarawa:tu # / (Pro. + Cond. + Stem: (un-
analyzable)

on the pattern of

(d)

UR / # suhc- + kwicku # / (Pro. + Cond. + Stem: 'think')

SR sohckwicko 'if you think'

and also the form

(e)

UR / # suhc- + ana # /

(Pro. + Cond. + Stem: 'go
about')

SR sohcana

'when you go about

In suhctarawa:tu 'if you are industrious' (form (c) above), the cluster ct clearly results from the final segment of suhc- (a composite prefix combining the Conditional and second person pronoun) in composition with a following t. Thus, suhctarawa:tu at least suggests that the surface cluster ct represents a neutralization. That suhc- represents the phonological shape of the underlying form of this prefix is plausible on the basis of forms (d) and (e) above.

In conclusion, if the sequence ct in the form atakictarok 'takes off water-bucket' derives from an underlying cluster tt, it may then represent the output of Bucca's rule B-1, which converts underlying tt to ct. However, as no additional textual evidence can be brought to bear on the matter, we suggest that Bucca's rule B-1 be considered a rule of Stop Affrication, and reformulated as follows:

PR-7: STOP AFFRICATION

$$t \longrightarrow c / \text{ — } t$$

To continue through the obstruent series, it is clear from textual evidence alone that underlying geminate clusters of the segment kk are also reduced, and prevented from appearing in the surface representation of Kitsai forms. In these following forms, however, the ill-formed surface sequences of *kk are reduced by the operation of a rule of deletion. (The conversion of underlying r to n and the lowering of

underlying u to o in the forms above, result from N-FORMATION (PR-2) and VOWEL LOWERING (PR-1), discussed elsewhere here). Consider the following derivations:

(f)

UR / # ri- + yak + -kina # / (Pot. + Stem: 'wood' + Mod.
'dense')

SR niyakina 'large (dense) wood is'

(g)

UR / # ri- + kirik + -kina + -wa # / (Pot. + Stem: 'eye' + Mod.
'large' + Dist.)

SR nikirikinawa 'eye is large'

(h)

UR / # a- + s- + rak- + kirik + (Indef./Dur. + 2p. + pl +
-u # / Stem: 'person' + Abs.)

SR asnakiriku 'you (pl) people'¹

(i)

UR / # i- + s- + rak- + kusik + (Imper. + 2p. + pl + Stem:
-u # / 'pick up' + Abs.)

SR isnakosiku 'you (pl) pick up!'

Our analysis is apparently supported by a rule posited by Bucca (1969) (his B-2) which also deletes surface deminate k- clusters:

B-2:

Ex: asnak + kika = asnakika 'you (pl) drink'

atarak + kasik = atarakasik 'we (pl in) break it'

Forms such as those elucidated above, in which ill-formed surface sequences of *kk are converted to k, support motivation of a rule of Stop Deletion, applicable here to surface *kk and which we tentatively formulate as follows:

PR-8: K-DELETION

$$k \longrightarrow \emptyset / k \underline{\quad}$$

Geminate clusters of glottal stop ?? appear neither in the underlying representations nor in the surface representations of any attested Kitsai forms, and are therefore excluded from discussion here.

Similarly, geminate clusters of the affricate cc occur neither in underlying nor in surface representation.

Bucca (1969) posits a rule (B-3) to account for putative underlying geminate clusters of ss as follows:

B-3.

(t) $s + s = \emptyset s$

Ex: $yuhts + sakuksata = yuhtsakuksata$

'when sun goes down'

Bucca's positing the sequence ts + s as the input to his rule B-3 is based on his interpretation of surface phonetic t^s as bisegmental ts, rather than as the mono-segmental affricate c. We suggest that a more insightful formulation and derivation of Bucca's example-form is as follows:

(j)

/ # yuhc- + sakuksata # /

(Cond. + Noun Stem: 'sun' +
Verb Stem: 'go down')

yuhcakuksata

'when sun goes down'

The rule accounting for the above derivation, then, is reformulated here as follows:

PR-9: S-DELETION

$$s \longrightarrow \emptyset / c \underline{\quad}$$

It should be noted that morphological analysis of the Lesser texts does not to date support positing geminate clusters of ss in the underlying representation of Kitsai forms. Second, Bucca's rule B-3 above, deleting putative surface clusters of underlying s + s is shown to depend on what we believe to be an incorrect analysis of underlying / c + s /, and consequently, requires to be superseded by our S-DELETION rule (PR-9), which, of course, is not a geminate cluster-deleting rule as now formulated.

With respect to geminate clusters of hh, Bucca formulates a rule (his B-5) which deletes the first of two adjacent h when these immediately precede a high vowel, i.e., i (1969:18). His rule is as follows:

B-5:

$$h + hi = \emptyset hi$$

Ex: arah + hi:tkusk = 'puts in water on
 arahi:tkusk fire (pl)'

In support of Bucca's solitary example, we are only able to add the following form, but one which is quite clearly understood in its underlying representation:

(k)

| | |
|--|--|
| <p>/ # ickur- + i + sinih- + hiriwick + -u # /</p> <p>ickorisinihiriwicko</p> | <p>(Mod. + (?) + Pass./ Instr. + Stem: 'treat/ consider' + Abs.)</p> <p>'(3 sg) is well treated/ considered by'</p> |
|--|--|

(As noted earlier, VOWELING LOWERING (PR-1) has automatically converted underlying u to o.)

In the underlying representation of the form (k) above, the final h of the Passive/Instrumental prefix sinih- is followed by the initial h of the stem hiriwick 'treat/consider' to create the underlying geminate cluster h + h, which surfaces as *hh. This cluster is clearly destroyed in the surface representation, apparently deleted by a rule such as:

PR-10: H-DELETION

$$h \longrightarrow \emptyset / h \underline{\quad}$$

which has the same output as Bucca's rule (B-5) without the need to specify the following vowel as high, i.e., as i (Bucca 1969:18).

To summarize, we have posited a Surface Structure Constraint on geminate clusters of obstruent consonants. These clusters, as we have attempted to show, are permitted as well-formed in the underlying phonological representations of Kitsai forms but are disallowed and marked as ill-formed in the surface phonetic representations, and in fact, do not appear as surface clusters at all. We attribute the surface non-occurrence of these ill-formed clusters to a Surface Structure Constraint, which we have formalized as:

SURFACE STRUCTURE CONSTRAINT ON GEMINATE OBSTRUENT CLUSTERS

$$* C_i C_j$$

conditions: 1. where C = (-son)

2. where i = j

We have then attempted to show that various geminate obstruent clusters permitted in the abstract underlying representation are destroyed or reduced on the surface phonetic level by various phonological rules. These rules, in turn, have been exemplified and may be summarized as follows:

Table 11.

Geminate Obstruent Cluster Reduction

| <u>UR</u> | <u>*SR</u> | <u>Reduction Rule</u> | <u>SR</u> |
|-----------|----------------------------|-------------------------|-----------|
| tt | *tt | STOP-AFFRICATION (PR-7) | ct |
| kk | *kk | K-DELETION (PR-8) | k |
| (??) | (unattested) | - | - |
| (cc) | (unattested) | - | - |
| ss | (<u>cs</u> by reanalysis) | S-DELETION (PR-9) | c |
| hh | *hh | H-DELETION (PR-10) | h |

The authors of SPE assume that "cluster simplification rules", which correspond to our deletion rules, delete the first of two identical consonants (Chomsky and Halle 1968:46, 243). It is interesting that those morphophonemic rules (B-1, B-2, B-3 and B-5, above) posited by Bucca (1969) to delete geminate clusters are also considered to delete the first of two identical segments.

Our reanalysis of Bucca's bisegmental cluster ts as the mono-segmental c has resulted in a reformulation of Bucca's ts + s = ∅s as our S-DELETION rule (PR-9):

$$s \longrightarrow \emptyset / c \underline{\quad}$$

in which it is clearly the second segment which is deleted by the rule. This has been regarded by us as a piece of empirical evidence indicating that cluster deletion rules in Kitsai delete the second, rather than the first, segment.

NOTES TO CHAPTER 10.

¹There are two homophonous noun stems with the form kirik. One means 'eye', the other, 'person'. The form for 'eye' occurs in the verb 'to be awake'.

11. THE EVIDENTIAL: PREFIXATION AND SUFFIXATION

The pages which follow were written with two purposes in mind. The first is to provide an analysis of a consonant cluster which is frequent in the Kitsai language, and especially common in certain forms of the verb. The second is to present a sketch of a small part of Kitsai verb morphology which is frequently attested in the texts, and which represents a significant and interesting part of Kitsai grammar. By treating both phonology and morphology, we hope to illuminate both.

Among the more frequently encountered consonant clusters in the language are those which comprise the sequence kw. This cluster occurs word-initially, or preceded by either a vowel or a consonant, and is always followed by a vowel. The pattern may be schematized as follows:

(#) kw + V

Consonant clusters which include kw in surface phonetic representation are as follows: kw, tkw, ckw, hkw, skw, ykw, hckw, kskw, and ytkw. In his taxonomic phonemic sketch, Bucca maintains both k and w as distinct phonemic segments, and regards the sequence as the bisegmental cluster k + w rather than as monosegmental labialized k or k^w (Bucca 1969:9).

Bucca, however, regards some instances of the sequence kw as derived from three rules, which he formulates and exemplifies as follows (Bucca 1969:18-19):

B-7.

t + w = tkw

Ex: at + wicku = atkwicku

'I think'

atut + wi = atutkwi

'I hold it'

B-12.

s + w = skw

Ex: as + wicku = askwicku

'you think'

aya:s + wana = aya:skwana

'they (pl) go around
hunting'

B-25.

u + V = wV (where V is not u)

Ex: ku + akikakya = kwakikakya

'he cried'

Bucca's rules B-7 and B-12 above may be summarily conflated into the following rules:

(B-7 and B-12):

$$\emptyset \longrightarrow k \quad / \quad \begin{bmatrix} t \\ s \\ c \end{bmatrix} \quad \underline{\quad} w$$

B-25.

u \longrightarrow w/ V (where V is not u)

We shall attempt to show that Bucca's rules (B-7 and B-12), which amount to rules of k-epenthesis, are not adequate to account for certain surface phonetic appearances of kw and that, moreover, Bucca's rule converting u to w before any vowel but u, is also not able to account for certain surface phonetic occurrences of kw in Kitsai. We believe that the analysis to be presented below will provide a more revealing account of kw in Kitsai.

First, Bucca's claim in his rules B-7 and B-12 is that the grammar of Kitsai includes a rule of k-epenthesis, which inserts a k after the segments t, s, or c and before w. We find this claim implausible, in view of the morphology of the verb in question. The singular paradigm is as follows:

| | |
|-----------------------------|-----------------|
| 1p. atkwicku | 'I think' |
| 2p. askwicku | 'you think' |
| 3p. a + \emptyset + wicku | '(3 sg) thinks' |

The underlying form of the verb stem is apparently / # kwicku # /. The segments t and s are the first and second person subject pronouns, respectively. As in many North American languages, third person is unmarked. The word-initial a- is the Indef./Durative Prefix. Bucca's k-epenthesis, we believe, is not epenthesis at all, but instead represents an instance of morphologically conditioned k-deletion in the third person. In any case, his rules (B-7 and B-12) certainly do not represent separate sources of kw. Furthermore, we believe that the kw in kwicku 'think' is probably the output of our VOWEL GLIDING rule (PR-11).

Much of the evidence to support an alternative analysis of kw is based upon verb forms which are characterized morphologically as inflected for the Evidential.

The Evidential is an inflectional category which is, however, neither aspectual nor modal (Parks, personal communication, 1980), and which is consistently associated with Kitsai with forms glossed in the past tense. In the cognate Caddoan languages, the Evidential indicates the "evidential" attestation of a statement with respect to the narrator's judgements concerning the validity of an event narrated by him. Specifically, the

Evidential formatives [in Pawnee] "...are used with all verbs whenever a speaker has not been a direct witness to a particular act or situation ... [and] they are used particularly in narratives." (Parks 1976:225). Although the Evidential may also function to distinguish firsthand and secondhand testimony in Kitsai as well, this can only be inferred. Attested Kitsai forms in the Evidential are glossed in past tense or aorist.

In Kitsai, most verb forms in the Evidential are characterized morphologically by what appears to be a two-part construction.

The first part is represented by a prefix construction which apparently comprises two separate but often coordinate morphemes, or possibly a single but discontinuous prefix with the surface phonetic shape:

(a)

(#) koko- or (#) ko...ko-

The second part of the Evidential construction consists of a word-final suffix, the most common surface phonetic alternant of which is:

(b)

-ya #

To summarize, the Evidential is characterized morphologically by a complex construction affixed to the verb stem and/or other affixed elements:

(c)

(#) ko- (...) ko- + Stem [et.al.] + -ya #

Kitsai verb forms inflected in the Evidential typically appear as follows; the Evidential Prefix and Suffix have been underlined:

(d)

| | |
|--------------------------|----------------------|
| <u>kokowaktekya</u> | '(3 sg) hooted' |
| <u>kokocyakatatokya</u> | '(3 sg) opened door' |
| <u>kokorayawacitikya</u> | 'they (pl) exited' |

Note that in (d) above, the prefixed elements are contiguous, and also word-initial, whereas in (e) below

(e-1)

| | |
|--------------------------------|----------------------------|
| <u>kosih</u> <u>kokakoskya</u> | '(3 sg) was put inside by' |
|--------------------------------|----------------------------|

(e-2)

| | |
|------------------------------|------------------------|
| <u>koyak</u> <u>koiwatya</u> | '(3 sg) undid himself' |
|------------------------------|------------------------|

the prefixed elements are separated, in (e-1) by the Passive/Instrumental Prefix sih-, and in (e-2) by the Reflexive Marker -ya-.

It is probable that future examination of additional forms in the Evidential will yield a more refined analysis of the morphological and semantic structure of the Evidential in Kitsai. We suspect that the two prefixed elements ko ... ko- probably represent frequently co-occurring but separate morphemes, the precise meanings of which have been obscured by the Evidential forms having, as part of their translation, been glossed in 'past tense'.

A small number of Evidential forms lack one of the usual two ko elements and also bear glosses which suggest that the ko which does occur may, in fact, be a complement or Indefinite marker. Examples of these are given in (f) and (g-1) through (g-4), below:

(f)

konakatonatya'who may have been lost in
woods'

The morphological structure of the string of elements between the initial ko- and the final -ya is not well understood in (f) above. In these forms in (g) below, however, the morphology is sufficiently transparent to isolate the initial ko and terminal -ya as co-occurring residual elements which must constitute at least part of the Evidential construction; in these forms, the stems have been underscored:

(g-1)

/ # ku- + atki + ia # /(Evid. Pref. + Stem: 'kill' +
Evid. Suff.)

kwatkya

'I killed'

(g-2)

/ # ku- + acihunayaki + ia # /(Evid. Pref. + Stem: 'we dance'
+ Evid. Suff.)

kwacihunayakya

'that we've danced'

(g-3)

/ # ku- + akikak + ya # /(Evid. Pref. + Stem: '(3 sg)
cry' + Evid. Suff.)

kwakikakya

'(3 sg) cried'

(g-4)

/ # ku- + a + rah + ka: + wi +
ia # /(Evid. Pref. + Ind./Dur. +
3 pl + Loc. + Verb: 'sit' +
Evid. Suff.)

kwarahka:wia

'who (pl) inside sat'

Notice that in the last form above (g-4), the suffix takes the surface phonetic shape -ia # rather than -ya #. Note also that, as the non-Evidential of this form is arahka:wi 'they (pl) sit inside', the prefixed ko- (here kw-) apparently relates to the translation 'who' in the gloss. The parallel with the gloss 'that' in (g-2) above, suggests the function of the ko.

To summarize this point in the discussion, those Kitsai verb forms which are marked in the textual glosses as being in the Evidential are characterized by: (1) a prefix construction of often two, but sometimes one, element(s) with the surface phonetic shape ko-. These elements, when both are present, may or may not be contiguous. Whether one or both are present, the prefix construction may or may not stand in word-initial position, and (2) whether one or both prefix elements are present, the form takes a word-final suffix with the surface phonetic shape -ya # or -ia #.

Our concern here will be with what we consider phonologically conditioned alternations of the surface phonetic shape of the prefixed elements of the Evidential construction, rather than with their precise meanings or functions, per se.

We have previously motivated a rule, VOWEL LOWERING (PR-1), which converts underlying u to o in word-initial and interconsonantal position, and sometimes word-finally.

On this basis, we posit the sequence ku- as the underlying phonological representation of the Evidential Prefix(es). The choice of ku- as over against ko- is, however, not a principled one.

Observe that in the following surface phonetic forms, VOWEL LOWERING (PR-1) has applied, and converted underlying u to o before each of the consonants of the Kitsai consonantal series. (GLIDE FORMATION PR-6 automatically converts the Evidential Suffix -ia # to -ya #.)

(h)

| | |
|--------------------|-----------------------------------|
| kokotaweretikya | '(3 sg) reclined against' |
| kokokatonatya | '(3 sg) was lost in woods' |
| koko?anya | '(3 sg) went about' |
| kokocakya | '(3 sg) struck and killed' |
| kokohonahcakya | '(3 sg) stuck in ground' |
| kosihkocikstawatya | '(3 sg) was unhanded by' |
| konakatonatya | 'who may have been lost in woods' |
| koyakorikatehowe | '(3 sg) took in arms' |
| kokowakokya | '(3 sg) said' |

The following derivations illustrate the preceding forms, all of which are, as noted, fully surface phonetic.

(i)

| | |
|---------------------------------------|--|
| UR / # ku- + ku- + wakuk + -ia # / | (Evid. Pref. + Stem: 'speak' + Evid. Suff.) |
| / # ko- + ko- + wakov + -ia # / | VOWEL LOWERING |
| / # ko- + ko- + wakov + -ya # / | GLIDE FORMATION |
| SR kokwakokya | '(3 sg) said' |

(j)

UR / # ku- + ku- + hunan + caki + (Evid. Pref. + Noun 'land' +
-ia # / Verb 'strike' + Evid. Suff.)

/ # ku- + ku- + hunah + caki + H-FORMATION
ia # /

/ # ko + ko + honah + caki + VOWEL LOWERING
ia # /

/ # ko- + ko- + honah + cak + GLIDE FORMATION
ya # /

SR kokohonahcakya '(3 sg) stuck in ground'

From the above derived forms, it is apparent that the rules do not interact, and are, therefore, intrinsically ordered.

Note, however, the alternation of shape undergone by the Evidential Prefix when followed by a vowel, as in these forms below:

(k-1)

akikak '(3 sg) cries'

kwakikakya '(3 sg) cried' (Evid.)

(k-2)

anariki '(3 sg) stands there'

kwanokwarikya '(3 sg) stood there' (Evid.)

(N.B.: In (k-3) the Locative an 'there' takes an epenthetic vowel to block H-FORMATION, which would convert n to h before k.)

(k-3)

awacitik '(3 sg) exits'

kwawacitikya '(3 sg) exited' (Evid.)

Compare also these Evidential forms with respect to the alternation of the prefix(es) ku...ku:

(k-4)

| | |
|----------------------------|--|
| <u>kokowi</u> :tikya | '(3 sg) sat down' (Evid.) |
| <u>kokwitkatawi</u> :tikya | '(3 sg) sat down at fire's edge' (Evid.) |

(k-5)

| | |
|----------------------|------------------------------------|
| <u>koyakwaha</u> | '(3 sg) came' (Evid.) |
| <u>koyakora</u> ?aha | '(3 sg) came with in hand' (Evid.) |

On the basis of these forms above and others like them, we posit the following rule which we designate PR-11: VOWEL GLIDING

$$u \longrightarrow w / \text{ ______ } V$$

It should be noted that our VOWEL GLIDING (PR-11) is essentially the same as Bucca's rule (B-25) above, except that his rule specifies the vowel in the rule environment as any vowel but u (Bucca 1969:18). This specification is probably not necessary, however, in view of our proposed Constraint on Geminate Clusters, which, as we have suggested, should probably be extended to vowels as well as consonants. By this analysis, the sequence u + u would automatically be reduced from *uu to surface u.

The motivation for VOWEL GLIDING (PR-11), then, constitutes the determination of one underlying source of the surface phonetic alternation of the Evidential Prefix(es) ku/kw.

However, the alternation of ku/kw is also related to the surface phonetic alternant ko. As noted earlier above, the alternant ko, as well as other surface occurrences of o, are held to result from the application of our rule VOWEL LOWERING (PR-1).

The following derivations will clarify the interaction of VOWEL GLIDING and VOWEL LOWERING.

(1)

| | | |
|----|--|--|
| UR | / # ku- + an- + (u) + ku- + ariki + -ia # / | (Evid. Pref. 1 + Loc. + u + Evid. Pref. 2 + Stem: 'stand' + Evid. Suff.) |
| | / # ku- + an- + (o) + ku- + ariki + -ia # / | VOWEL LOWERING |
| | / # kw- + an + (o) + kw- + ariki + -ia # / | VOWEL GLIDING |
| | / # kw- + an + (o) + kw- + arik + -ya # / | GLIDE FORMATION |
| SR | kwanokwarikya | '(3 sg) stood there' |

(m)

| | | |
|----|---|--|
| UR | / # ku- + an + (u) + ku- + ariki + -ia # / | (Evid. Pref. 1 + Loc. + (u) + Evid. Pref. 2 + Stem: 'stand' + Evid. Suff.) |
| | / # kw- + an(u) + kw- + ariki + -ia # / | VOWEL GLIDING |
| | / # kw- + an(o) + kw- + arikya # / | VOWEL LOWERING |
| | / # kw- + an(o) + kw- + arikya # / | GLIDE FORMATION |
| SR | kwanokwarikya | '(3 sg) stood there' |

As seen in the above two derivations of kwanokwarikya '(3 sg) stood there', the output is identical regardless of the ordering of VOWEL LOWERING and VOWEL GLIDING. However, the derivation (1) claims that underlying u is converted to o by VOWEL LOWERING, only after which does VOWEL GLIDING apply, converting certain o to w. The total derivation, schematized as /u/ → /o/ → /w/ is held to be less likely than the sequence resulting from derivation (m) in which /u/ → /w/. In derivation (1), VOWEL LOWERING can apply (in this form) only to interconsonantal u, while VOWEL GLIDING applies precisely to those underlying u to which VOWEL LOWERING cannot apply. Therefore, although the two rules do not interact, ordering VOWEL GLIDING before VOWEL LOWERING preserves the more natural scheme:

1. /u/ → w / V
2. /u/ → o / $\left\{ \begin{array}{l} [C] \quad \text{---} \dot{C} \\ [\#] \quad \text{---} \end{array} \right\}$ i.e., 1 < 2
 $\left([\text{---} \#] \right)$

We shall now attempt to show that there is an additional source of surface phonetic kw which cannot be accounted for by our rule of VOWEL GLIDING. These surface appearances of kw are clusters which are created not by vowel alternation but by composition. Consider the following forms, in which it is clear from morphological evidence that certain kw in these forms cannot be considered to derive from underlying ku.

(n-1)

/ nutarak + wakoku /

(Inchoat. + pl in) + Stem:
'fight')nutarakkwwakoku'we (pl in) are about to
fight'

(n-2)

/ asterak + wakoku /

(Fut + pl in) + Stem: 'fight')

asterakkwwakoku

'we shall (pl in) fight'

/ ni + wakok /

'they (pl) fight'

(n-3)

/ asterak + wa?anu /

(lp. pl in + Fut + Stem: 'eat')

asterakkwwa?anu

'we (pl in) shall eat'

/ asti + wa?anu /

'I shall eat'

It is clear that the kw sequences in the preceding forms cannot derive from underlying ku by VOWEL GLIDING, because these surface kw result from composition, such that their underlying representation is /...k + w.../; that is, these are clusters with internal formative boundaries.

To summarize the situation with respect to the surface cluster kw, it is clear that: (1) some kw result from the application of our VOWEL GLIDING (PR-11) to underlying /ku/; (2) the ko alternant results from the application of our VOWEL LOWERING (PR-1); (3) some kw result from composition, and their underlying representation is really /...k + w.../; (4) the simultaneous presence in surface phonetic representation of kw/ku and of kw (/...k + w.../) establishes the reality of a contrast in underlying phonological representation which is neutralized in surface phonetic representation.

Our treatment here of the Evidential Suffix will be brief, for several related reasons. First, the surface phonetic shapes which the Evidential Suffix may take are more varied, and their morphology somewhat more complex than is the case with the Evidential Prefix construction. At the same time, our present understanding of the morphology of suffix formation in verbs in the Evidential is also somewhat more limited.

In the foregoing discussion of Evidential forms, we have assumed, especially in derivations, that the Evidential Suffix in its underlying representation is -ia #. We have also regarded the characteristic surface phonetic form of the suffix as -ya #, the result of the application of our GLIDE FORMATION (PR-6). We shall indicate here in summary fashion the evidence for these assumptions.

To begin with, it is clear that verbs in stem-final ...CV# show a predictable alternation in their corresponding Evidential forms. Consider the following sets of forms in their respective non-Evidential and Evidential shapes:

(o)

| | |
|---------------------------|----------------------------------|
| <u>siniocikstawati</u> | '(3 sg) is unhanded by' |
| <u>kosihkocikstawatya</u> | '(3 sg) was unhanded by' (Evid.) |
| <u>ickonirawa:ki</u> | 'good time extends' |
| <u>kockorawakya</u> | 'good time extended' (Evid.) |
| <u>a:ki</u> | '(3 sg) kills' |
| <u>kokokya</u> | '(3 sg) killed' (Evid.) |
| <u>anariki</u> | 'there (3 sg) stands' |
| <u>kwanokwarikya</u> | 'there (3 sg) stood' (Evid.) |

Of the verb forms in stem-final ...CV # for which corresponding Evidential forms are attested, the most common are those in ...ki #; forms in ...ti # are much less frequent, and forms in ...?i are unattested.

Several forms occur as hapax legomena in either Evidential or non-Evidential alternants, and are presumably governed by the same phonological process operative in (o) above. These are:

(p)

| | | |
|------------|-----------------|----------------------------|
| Non-Evid.: | akeriwati | '(3 sg) saves' |
| | nuhteaki | '(3 sg) rubs him' |
| | ahocaki | '(3 sg) washes' |
| Evid.: | koyakokiwatya | '(3 sg) undid himself' |
| | kokokatonatya | '(3 sg) was lost in woods' |
| | kokorahkostakya | '(3 sg) kept them hidden' |

The isolated form kukwihku?ucya 'he spread out' (= 'he butchered?') is the only attested form in which the Evidential Suffix is affixed to the stem-final affricate c, i.e., the only Evidential in -cya #. Consider also the following forms with terminal segments in -k^h:

(q)

| <u>non-Evidential</u> | | <u>Evidential</u> | |
|---------------------------|-------------------------|-------------------|---------------------------|
| arayawacitik ^h | 'they (pl) exit' | kokorayawacitikya | 'they (pl) exited' |
| awaktek ^h | '(3 sg) [owl] hoots' | | |
| ok ^h | '(3 sg) is' | kokowaktekya | '(3 sg) hooted' |
| akikak ^h | '(3 sg) cries' | | |
| ohoyarik ^h | '(3 sg) stops-standing' | kokokya | '(3 sg) was' |
| | | kwakikakya | '(3 sg) cried' |
| | | kokohoyarikya | '(3 sg) stopped standing' |

As we have argued previously above that the segment k^h actually represents k + voiceless vowel, these forms in (q) above probably ought to be regarded as terminating in ...CV # as well.

Note, however, the result when the Evidential Suffix is affixed to a verb stem with a final consonant:

(r)

| <u>non-Evidential</u> | | <u>Evidential</u> | |
|-----------------------|---------------------|-------------------|---------------------|
| awanas | '(3 sg) cooks meat' | kokwanasya | 'was (cooked) meat' |

Observe also the shape of the suffix when these vowel-final forms take the Evidential:

(s)

| <u>non-Evidential</u> | | <u>Evidential</u> | |
|-----------------------|---------------------|-------------------|---------------------|
| awana | 'they (pl) go' | kokowanya | 'they (pl) went' |
| akirikana | '(3 sg) awakens' | kokokirikanya | '(3 sg) awakened' |
| a?ana | '(3 sg) goes about' | koko?anya | '(3 sg) went about' |

The clear presence of -ya # in the surface phonetic representations in (r) and (s) above, strongly supports positing -ia # as the underlying form of the Evidential Suffix. The choice between -ya # and -ia # however, is not a principled one.

An important set of exceptions, however, to the pattern of suffixation indicated above is a class of verbs in stem-final -wi #.

| <u>non-Evidential</u> | | <u>Evidential</u> | |
|-----------------------|-------------------------------------|--------------------------|---------------------------------------|
| arahka:w <i>u</i> | 'they (pl) sit inside' | kwarahka:w <i>ia</i> | 'who (pl) sat inside' |
| niyakonitkw <i>u</i> | 'they-them(selves) settle-to-sleep' | kwihkwakonitkw <i>ia</i> | 'they-them (selves) settled to sleep' |

The preceding discussion may be summarized as follows:

- (1) Stems in final -ti # and -ki # become -tya # and -kya # in the Evidential; stems in final -?i # are unattested.
- (2) The fact of one attested Evidential in final -cya # indicates that stems exist in final -ci # which behave similarly to (1), above.
- (3) The persistent surface phonetic appearance of the suffix -ya # in the Evidentials of consonant-final stems in s # and also in -na #, by which these become -sya # and -nya #, respectively, further suggests that the underlying representation of the Evidential Suffix might best be posited as -ia #, in order to account for the unexpected surface phonetic appearance of Cya # in forms in stem-final C(a) #. The forms in s # and na #, however, are not well understood.

Assuming as we do that the Evidential Suffix consists of the two segments -ia #, affixation of the suffix to forms terminating in ...Ci # should be represented in underlying form as:

$$/ \dots Ci + -ia \# /$$

which then becomes in surface representation:

$$\dots *Cia \#$$

Forms terminating in ill-formed surface strings such as $\dots *Cia \#$, however, would then be reduced by geminate cluster simplification (here I-DELETION).

$$\dots *Cia \# \longrightarrow \dots Cia \#$$

after which GLIDE FORMATION (PR-6) applies to produce Cya # .

GLIDE FORMATION does not apply to stem-final -wia #; forms in final-wia #, however, are also considered to be subject to the cluster simplification which applies to *wi + ia # to produce -wia #. Forms in a final consonant undergo GLIDE FORMATION to result in Cya #. The pertinent rules then, must be ordered as follows:

1. I-DELETION (PR-12) (in geminate clusters)

$$i \longrightarrow \emptyset / i \underline{\quad}$$

2. GLIDE FORMATION (PR-6)

i.e., 1 < 2

| | | |
|----|--|------------------------|
| UR | / # ku- + ya + ku + kiwati + ia # / | |
| | / # ko + ya + ko + kiwati + ia # / | VOWEL LOWERING |
| | / # ko + ya + ko + kiwati + ϕ a # / | I-DELETION |
| | / # ko + ya + ko + kiwatya # / | GLIDE FORMATION |
| SR | koyakokiwatya | '(3 sg) undid himself' |
| | | |
| UR | / # ku + a + rah + ka: + wi + ia # / | |
| | / # kw + a + rah + ka: + wi + ia # / | VOWEL GLIDING |
| | / # kw + a + rah + ka: + wi + ϕ a # / | I-DELETION |
| SR | kwarahka:wia | 'who (p1) sat inside' |
| | | |
| UR | / # ku + ku + anas + ia # / | |
| | / # ku + kw + anas + ia # / | VOWEL GLIDING |
| | / # ko + kw + anas + ia # / | VOWEL LOWERING |
| | / # ko + kw + anas + ia # / | GLIDE FORMATION |
| SR | kokwanasya | 'was (cooked) meat' |

12. CONCLUSION

It will have become clear that the investigation of Kitsai phonology is on-going, and that what has been presented must be regarded as partial and tentative.

Our attempt to argue for a monosegmental interpretation (c) of the phone t^s, against the bisegmental cluster (ts) interpretation of Bucca (1969) would provide the rather asymmetrical Kitsai phonetic inventory with a true affricate segment, which it otherwise lacks. Also, positing the affricate c makes possible the description of various phonological processes in terms of natural classes of segments, rather than in disparate, segment-specific rules as posited by Bucca (1969).

We have devoted considerable space to the analysis of resonant alternations in Kitsai, which, according to one investigator, "in... Caddoan generally...need a lot of work..." (Francesca Merlan, personal communication, 1974). While the analysis of resonant alternations is not yet complete, we think that some clarification has been provided.

We have also argued that the attested putative aspiration of n, w, and k, and also the putative palatalization of t, are surface phonetic reflexes of devoicing rules operating on certain vowels and consonants.

In addition, other phonological rules have been posited to relate the underlying phonological and surface phonetic representations of various consonant clusters in the language. At this point in the analysis of the language, these rules must remain, for the most part,

unprincipled. Some of these rules relate to a surface structure constraint on geminate obstruent clusters. Although it has not been motivated here, this constraint is thought to extend to all systematic phonemes of the language, and thus to constitute a linguistically significant generalization over the relationship between abstract phonological and surface phonetic representations of Kitsai formatives.

We have also motivated rules to account for some of the more salient features of the surface representations of Kitsai vowels.

Finally, we have sketched the morphology and phonology of prefixation and suffixation processes characteristic of the Evidential in Kitsai, which accounts for most of the Evidential forms attested in the corpus. Thus, while the emphasis has been primarily phonological, a significant part of this essay has been devoted to grammatical description which does not appear in previous work on the language.

It has been claimed that the complex, polysynthetic morphologies of the Caddoan languages, combined with their remarkably small phonetic inventories, have resulted in "deep" phonologies for these languages, in the sense that surface phonetic representations are relatively remote from their respective underlying phonological representations (Merlan 1975:iv). On the basis of this study of one extinct Caddoan language, we are inclined to believe this claim to be valid. This present analysis of Kitsai phonological structure is far from complete, and numerous surface phonetic representations, which we have not dealt with here, require detailed treatment. It is also evident that some underlying segments in the derivations here may in fact represent intermediate levels between the deepest underlying representation and the surface form. The explication of these deeper phonological relationships,

however, is well beyond the scope of this essay, and awaits further study.

We nonetheless hope that the analysis presented here may represent some contribution to the study of Kitsai, and to comparative studies of the Caddoan languages.

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