TOTONTEPEC MIXE
PHONOTAGMEMICS

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by
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Preface and Acknowledgements

This study was originally presented as a doctoral dissertation at the University of Michigan in February 1960. The author would prefer to make changes; the accuracy of the description would be enhanced by a re-analysis of new text material at this later time. There have been certain changes or trends in the use of terminology among other writers in tagmemics since the time of preparation of this study. However, it does not appear that there will be any considerable amount of time available for the rewrite in the near future, and so the materials are presented in essentially their original form, with occasional footnotes to bring it up to date, and an occasional correction or amplification of evidence.

Special acknowledgement is due to the members of the committee who have given of their time and effort in the preparation of this dissertation; to Professors David F. Aberle, James W. Downer, Lawrence B. Kiddle, Herbert Penzl, and Kenneth L. Pike, chairman.

To an exceptional degree, this dissertation is due to the influence of Professor Pike. First, it was through him that the author was first interested in linguistics and inspired to the study of American Indian languages. Secondly and obviously, the dissertation itself grows out of the stimulation to research given by Pike's Language in Relation to a Unified Theory of the Structure of Human Behavior. Thirdly, although in the course of the application of Pike's tagmemic model to phonology there have been some changes from a strict interpretation of the Pikean model, Professor Pike has insisted that the differences be carried into the analysis. This lack of sensitiveness to suggestions of change in his theories has made the preparation of this dissertation a much easier task than it would otherwise have been.

v

Table of Contents

TOTONTEPEC MIXE PHONOTAGMEMICS

TABLE OF CONTENTS

0

Introduction

The phonology of Totontepec Mixe (hereinafter usually abbreviated to TM) is presented here in terms of two major subdivisions, phonemes and phonotagmemics. Each of these subsumes a hierarchy of linguistic units. The phonemic hierarchy has as its smallest units phonemes (1.1), which combine to form syllables (2.1), the next level of structure in the phonemic hierarchy.[1] Syllables in turn combine to form phonemic-words (3.1), and phonemic-words to form phonemic-phrases (4.1). The following example, /mnʌ́hksup vàkvíˑnm kêp $\hat{\ }_3$/ 'you're going to Oaxaca City tomorrow' constitutes one phonemic-phrase, consisting of three pho-nemic-words (mnʌ́hksup, vàkvíˑnm, kêp), five syllables (mnʌhk, sup, vak, viˑnm, kep), and eighteen phonemes (m, n, ʌ, h, etc.). In addition to these levels there is postulated an accentual system consisting of stress characteristics and functioning at both phonemic-word and phonemic-phrase levels (3.1, 4.1), as well as an intonational system of pitch contrasts functioning at the level of phonemic-phrase com-position (4.3).

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[1] Numbers given in parentheses without explanation refer to para-graph headings in this study.

1

Parallel to the phonemic hierarchy is the phonotagmemic hierarchy. The units of this hierarchy are posited to describe the significant distributional structure of phonological materials. A unit of this hierarchy is conceptualized as a correlation between a significant position or slot in phonological structure and a class of substitution items which have potential for occurrence in that slot. The smallest units postulated in the TM phonotagmemic hierarchy are phonotagmemes (1.2). The progression in the hierarchy builds up from this to syllable-types (2.2), phonological-word-types (3.2), and phonological-phrase-types (4.2). A phonotagmeme in its simplest form consists of an emic or structurally significant slot (or position) in syllable structure, (for example an onset[2] slot), plus a list of phonemes which constitute the class of substitution items for that slot (for example a class C1). An occurrence of any member of the class in the structural position characteristic of the phonotagmeme in question constitutes an occurrence of the phonotagmeme. Similarily, a syllable-type consists of a significant slot in phonological-word-type structure plus a class of substitution items which are syllables.

Phonology in this description is thus described according to the following scheme:

PHONOLOGY

PHONEMIC HIERARCHY	PHONOTAGMEMIC HIERARCHY
Phoneme	Phonotagmeme
Syllable	Syllable-type
Phonemic-word	Phonological-word-type
Phonemic-phrase	Phonological-phrase-type

[2] The term "onset" and some others used in the description of syllable structure are taken from C. F. Hockett, A Manual of Phonology, Memoir 11 of IJAL, 1955, and will be further explained in 1.1.

The description does not go beyond the level of phono-logical-phrase structure. This does not mean that there are no higher levels of phonological structure, but merely that this description does not go beyond the level of phrases.

In this description, the terms "phonemic" and "phono-tagmemic" are used to refer to any unit in their respective hierarchies. Syllables as well as phonemes are phonemic units.

0.1. Purpose. This description is an application and test of the model for language structure presented in Kenneth L. Pike's Language in Relation to a Unified Theory of the Structure of Human Behavior, Parts I and II (Glendale, 1955,56). Its relevance as a test is enhanced by the fact that it is the first attempt to apply the model to the detailed description of phonological structure. [3] An additional pur-pose is that of explanation by illustration. Since Pike's Language is at best difficult reading, it is hoped that, by applying the theoretical framework in a fairly comprehensive manner to a phonological system, the model may be rendered more easily understandable. That the application is in the relatively simple area of phonology should make for a sim-pler presentation of the theory in some areas. However, it is also true that in some respects the model is more easily applied to morphological than to phonological materials.

Since this description is a demonstration and evaluation of a model for language description as well as a description of empirical data, a fairly large portion of the study is de-

[3] There have been some applications in restricted areas of pho-nology which have grown out of the recent Pike materials, however. Some of these are: K. L. Pike, "Abdominal Pulse Types in some Peruvian Languages," Language, 33.30-35, (1957); Harry and Lucille MacArthur, "Aguacatec (Mayan) Phonemes within the Stress Group," IJAL, 22.72-76, (1956); K. L. Pike and Willard Kindberg, "A Problem in Multiple Stresses," Word, 12.415-28, (1956).

3

voted to theoretical matters. At all times the theoretical discussion is based on the empirical data.

0.2. The language. Totontepec Mixe is one of the Mixe group of languages in the Mixe-Zoque language family, which consists of three main groups, Mixe, Zoque, and Popoluca. The language is spoken by approximately 4000 people living in the municipio of Totontepec, Distrito Mixe, in the state of Oaxaca, Mexico.

The present study is based on materials collected by the author under the auspices of the Summer Institute of Linguistics during the years 1951-57. The materials consist partly of data elicited from informants in citation forms or paradigmatic materials, and partly of connected text. Part of the connected text materials was transcribed directly from informants; a greater part was recorded on magnetic tape. The study of the larger phonological groupings has been based largely on the tape-recorded materials.

To date no materials on Totontepec Mixe have been published. With respect to all Mixe language groups the situation is little different. There are some older descriptions which are either very short, or make no distinction in the variety of Mixe treated. A bibliography of materials published up to 1951 is to be found in a study of Zoque made by Wonderly. [4]

0.3. Main characteristics of Pike's model. There are four characteristics of Pike's approach which are basic to this presentation. The very brief discussion of these points made here is not meant to be a complete nor adequate summary of Pike's Language. It should serve, however, to show the direction that the discussion will take and what the major

[4] William L. Wonderly, "Zoque I: Introduction and Bibliography," IJAL, 17.1-9, (1951).

4

considerations will be. These four characteristics are not independent of each other; no one of them can be discussed in detail without reference to some of the others. The four characteristics are: (1) language is viewed as behavior; (2) language is hierarchically ordered; (3) language consists of emic units; (4) language is trimodally structured.

That these four points are presented as characteristic of Pike's model does not mean that they are all to be found only there. Language is commonly viewed as behavior, and even related to other aspects of behavior. (However, Pike's point of view is distinct from that of many present-day linguists in the amount of importance attributed to this behavioral aspect of language in the basic definitions of the nature of linguistic science. Also Pike attempts to go farther than almost all if not all other linguists in the relating of language behavior to other aspects of human behavior.) In presenting linguistic structure in terms of a hierarchical organization, Pike's model reflects a trend in modern studies in linguistics. In the application of the terms "etic" and "emic" to language description, Pike makes explicit a distinction which must be reflected in any significant description of language. The concept of trimodal structuring is unique in Pike's approach. In the discussion of these four points, some reference will be made to the relationships of Pike's view to those reflected in the work of other present-day linguists. These comparisons are meant to be illustrative rather than exhaustive.

0.31. Language is viewed as behavior. Language is not "pure system"; the behavioral aspects come under the consideration of language itself. There is a direct connection between systematic relationships and physical actions -- those which produce speech on one extreme and meaningful responses to language on the other. This is to say that both

phonetics and meaning are considered as part of language. The importance of this in the overall approach may be seen in that the features which distinguish and define all relevant linguistic units have two sorts of characteristics; they are identificational (that is, they have reference to a phonetic base in articulatory behavior, directly or indirectly) and they are meaningful (that is, they occupy a significant position in a functioning cultural system).

Whereas the consideration of language as a part of structured human behavior is not by any means unique to Pike among linguists, the inclusion of evidence from the areas of articulatory behavior (phonetics) and from response behavior (meaning) as being directly relevant to the determination and definition of linguistic units and thence within the field of linguistics does distinguish Pike's point of view from that of many prominent figures in present-day linguistic discussion. George L. Trager, in The Field of Linguistics, for instance, considers phonetics to be Prelinguistics, and semantics to be Meta-linguistics. [5] He then defines an area between these two as: "Microlinguistics, which from now on will be referred to simply as linguistics... deals with the analysis of language systems." [6]

A similar statement is to be found expressed by Martin Joos in an article entitled "Description of Language Design". Joos states: "Above the highest level (of linguistic structure) we find...conditional probabilities of occurrence: this is the semantic field, outside linguistics, where sociologists can work. Below the lowest level we find, instead of such absolute restrictions, conditional probabilities of phonetic quality: this is the phonetic field, outside linguistics, where

[5] George L. Trager, The Field of Linguistics, Studies in Linguistics Occasional Papers 1, Norman, Oklahoma: Battenburg Press, 1947.

[6] ibid. p. 4.

physicists can work."[7] In contrast, Pike considers phonetic characteristics and response characteristics as a part of the definition of every phonological unit. He further maintains that this definition is part of linguistics.

Beyond this, Pike views language as comprising one part of a larger totality of structured human behavior. It is inextricably mixed with other aspects of this totality; language behavior constitutes a significant part of practically all human behavior. Nor can language be considered except in relation to other aspects of structured behavior. The fact mentioned above, that physical actions enter into language as part of it, illustrates this. Pike proposes therefore to describe language in a manner that will give maximum cognizance to its relationships to this totality of structured human behavior. He postulates in his Language a model for description which is directed towards the goal of describing all behavioral units within one common framework.

It is not within the scope of this study to test the applicability of Pike's model for all structured human behavior. The discussion is restricted to the relevance to linguistic materials, and within this to the area of phonology. The question may be raised as to the meaningfulness of such a test when the larger significance of Pike's theories for the totality of structured human behavior has not been tested. There are two reasons which justify this restricted application. First, the validity or applicability of the model for linguistic description does not necessarily depend on its complete applicability in the more inclusive areas of behavior. There may be, for instance, certain characteristics distinguishing language behavior from other behavior which

[7] Martin Joos, "Description of Language Design," Journal of the Acoustical Society of America, 22.701-08, (1950). Reprinted in Readings in Linguistics, Martin Joos ed., Washington: American Council of Learned Societies, 1957, pp. 349-56.

would make certain parts of the theory not applicable to be-havior outside language proper, without affecting the appli-cability of the model to language structure. However, even though Pike's views as now presented in his Language should not be adequate for the description of all behavior, (it would be wild to presume that this first attempt would be), this does not mean that such a method is not possible.

Second, whereas there is an emphasis in Language toward the extension of the model presented to all aspects of structured human behavior, the primary emphasis is not on a linguistically-centered analysis of behavior, but, as the title states, on a theory for the description of language which is based on the relationships of language behavior to be-havior in general. Thus, the primary area of relevance for the theory is in linguistics, and the primary tests of applica-bility are also to be made there. Extension to other areas of behavior is a next step. It is especially important to know if the model is in need of considerable revision for application to language descriptions, before it is extended to other areas.

0.32. Language is hierarchically ordered. Language, in Pike's model, consists not merely of sequences of units put together like beads on a string, but of units in significant layerings. The larger more inclusive units are determined partly--though not entirely--in terms of the smaller less in-clusive units of which they are composed. The smaller units moreover occur only in structurally relevant positions within larger more inclusive units in the hierarchy.

Hierarchical views of language are common. Such a point of view is especially apparent in descriptions of languages according to an immediate constituent type of approach. Charles F. Hockett makes a thorough-going application of hierarchical structuring in his immediate con-

stituent approach to both the areas of grammar-lexicon and phonology. [8]

There are some differences between the specific view of the hierarchical organization presented in Pike and those presented by other linguists. Some of these differences do not stem from a difference with respect to the basic question of whether hierarchical structure is characteristic of language; rather they derive from the trimodal approach to linguistic units taken by Pike. The Pikean hierarchical structuring will be outlined in 0.321. Others of the differences relate to the extent that hierarchical structuring is applied to language description. We are especially concerned with differences in the extent to which a hierarchical description of phonological materials is posited or attempted. This will be discussed briefly in 0.324.

0.321. Hierarchies postulated by Pike. As Pike views the hierarchical structure of language, there is a hierarchy of phonological units distinct from a hierarchy of lexical or morphemic units, and also distinct from a hierarchy of grammatical or tagmemic units. The phonological hierarchy is composed of a pyramiding succession of units, phonemes to syllables to phonemic-words to phonemic-phrases. The lexical hierarchy builds up through various morpheme combinations to words, phrases, clauses, etc.

The hierarchy of tagmemic units consists of a pyramiding succession of units which Pike labels as "slot-class

[8] His hierarchically organized immediate constituent analysis of grammar is most recently presented in his A Course in Modern Linguistics, New York: The MacMillan Co., 1958, pp. xxi, 605. This work also describes phonological structure. Phonology is better presented, however, in Manual of Phonology, Memoir 11 of IJAL, 1955. It should be pointed out, however, that Hockett attributed the motive or organizing principle of his Manual in part to an earlier article by Pike and Eunice Pike, "Immediate Constituents of Mazatec Syllables" (Manual pp. 90, 93).

9

correlate" units (Pike, Language Chapter 7). These consist of an emic "slot", which is a meaningful position in the next higher layer of structure, plus a class of items which comprises the "filler class" of that slot. The units which constitute the membership of the filler class are morphemic units. The occurrences of these units constitute occurrences of the tagmemic unit. The filler classes of minimum tagmemic units are usually morphemes; the filler classes of higher-level tagmemic units are usually larger-level morphemic units (words, phrases, etc.).

This postulation of tagmemic units is the most distinctive characteristic of Pike's model as it is related directly to linguistic description. It is so central that the whole system is most often referred to as "tagmemics". It emphasizes that there is need, in grammatical description, for a differentiation more than just that of grammatical position, since position is meaningless apart from elements which, in a sense at least, objectify such positions. There is also need for more than just class structure, whether form classes or distribution classes, since class structure does not necessarily differentiate between different grammatical significances. That is, in English, "Nouns" occur both as "Subjects" and as "Objects". The units postulated by Pike to describe grammatical structure are thus composites or correlations between significant positional structure (slots) and classes of substitution items which "occupy" such slots. [9]

This description of phonology is to great extent the application of this same tagmeme principle to the area of sound structure. It could thus very well be considered a study of slot-plus-class correlations in the area of TM

[9] This question is discussed to considerable extent in Pike's Language, see especially Pike 7.321. Chapter 15 of Language, not yet published, also deals with this problem.

sound structure; thus the title "Totontepec Mixe Phonotag-memics".

0.322. Pike's tagmemic model and discovery techniques.
Another important characteristic of the Pikean view of hier-archical structure and especially of the tagmeme is that the model presented provides considerable help in discovery techniques as well as a descriptive model. In the actual application to language material, the tagmemic approach gives a unity in total method which makes for overall sim-plicity in analytical method at all levels and in all hier-archies of units. In this approach, all language structure is examined and described in terms of one basic principle of organization, that is in terms of classes of substitution items which occur in significant slots. There is no basic differ-ence between the approach to so-called "morphological" structure and the approach to "syntax".

Because of this, the model shows a great deal of flexi-bility in its application to various languages. A hierarchy of lexical or morphemic units and a hierarchy of grammatical or tagmemic units are postulated for all languages. However, the number of hierarchical levels of organization of struc-ture within the hierarchies is not prescribed by the model. A given language may have several relevant levels of struc-ture distinguished between the level of clause and that of morpheme, or it may have no significant layering between these levels. Either sort of language pattern is equally adaptable to the tagmemic approach.

The interest in the Pikean approach which has led to the present description was stimulated by the applicability of the tagmemic principle as an analytical method to grammatico-lexical materials, especially in the area of syntax. The study has grown out of an interest to see to what extent the same sort of approach could be applied to phonological

structure, especially for the treatment of larger phonological units.

0.323. A major difference in application of Pike's model. The greatest difference between this study and the model presented by Pike in his Language also has to do with the hierarchical organization of units. The detailed treatment of slot-plus-class correlations in phonology presented here involves the postulation of another hierarchy of linguistic units, namely a hierarchy of phonotagmemic units (1.2). These are units of distributional structure in phonology paralleling Pike's tagmemes as distributional units in lexico-grammatical structure. This results in a total view of language structure which, rather than being presented in terms of three hierarchies, is treated in terms of four hierarchies. However, these are arranged in two pairs, so that there is a hierarchy of filler units in phonological structure (the phonemic hierarchy) plus a hierarchy of slot-plus-class units (the phonotagmemic hierarchy). Parallel to this there is a hierarchy of filler units (the lexical or morphemic hierarchy) and a hierarchy of slot-plus-class units (the tagmemic or grammatical hierarchy). It is the opinion of this writer that this represents a more consistent interpretation of hierarchical structure according to the general premises of Pike's Language than that actually presented in Language. Reasons for this opinion are expressed in Chapter 6. The basic theoretical orientation of the description is still that of Pike.

0.324. Hierarchical structuring of phonology in Pike's model compared to other current views of phonological structure. That Pike's view of phonology takes cognizance of units of phonological structure larger than single phonemes does not make it unique among descriptions of pho-

nology. However, it is distinguished from many descriptions in the extent to which the hierarchical organization of phonology is explicitly stated in the descriptive framework.

In the simplest possible sense, to say that a view of phonology has hierarchical aspects is merely to say that it involves more than just "segmental" phonemes. Nearly all, if not absolutely all descriptions of phonemic systems involve this sort of reflection of hierarchical structure, insofar as they postulate such things as "suprasegmental" features or phonemes, juncture (if not included as suprasegmental), references to syllable structure, or patterned distribution of phonemes within some larger matrix.

There are some treatments of phonological structure which make extensive use of hierarchical ordering of units in discussing phonology. The best example of this known to this writer in terms of general overall approach is that of C. F. Hockett's Manual of Phonology. In the Manual, an immediate constituent analysis of phonological units is outlined and applied to many languages. Hockett's approach includes the consideration of a hierarchy of phonological units, ranging from an intonation contour unit down to the level of individual phonemes. Thus with respect to the characteristic of hierarchical ordering of units, Hockett's model for description is very much like that of Pike.

There are many actual descriptions which show considerable application of hierarchical ordering to phonological materials. Bernard Bloch in "Colloquial Japanese IV: Phonemics" describes the sound structure of that language in terms of phonemes, syllables (with considerable reservation), and phrases defined as phonological units.[10] Trager

[10] Bernard Bloch, "Studies in Colloquial Japanese IV: Phonemics," Language, 26.86-125, (1950). Bloch describes syllable structure but also states that the status of syllables as linguistic units in Japanese is questionable.

13

and Smith's Outline of English Structure makes use of the terms "phonemic phrase" and "phonemic word".[11]

An outstanding example of the description of significant structuring of phonological units larger than phonemes is to be seen in the recent studies of Einar Haugen. This appears especially clearly in his recent description of Icelandic phonemics.[12] It may be noted that not only is this a hierarchical approach to phonological structure, though it includes only the syllable level, but it is also in very close agreement with the manner in which such structure is handled in this description of TM. This is true even to the manner in which the distribution classes of phonemes are treated (see 1.3).

Although some evidence of hierarchical structure of phonological data is to be found in all phonemic descriptions, there are views of language structure which allow for much less consideration of this sort of structuring than that reflected in Pike's views and also those mentioned just above. Some such views seem to consider sequences of phonemes as having no relevant structuring in language beyond that of combining into units of the morphemic hierarchy. Phonemes combine to form morphemes which combine to form grammatical units or constructions. Such a view of language is hierarchical, but not in the sense that the idea of hierarchical structure is presented here and in Pike (as well as in Hockett and others), in which an entire hierarchy of phonemic units is postulated, paralleling the lexical and grammatical structure, but distinct from it.

Such an overall view of language structure seems to be

[11] George L. Trager and Henry Lee Smith, An Outline of English Structure, Studies in Linguistics Occasional Papers 3, Norman, Oklahoma: Battenburg Press 1951.

[12] Einar Haugen, "The Phonemes of Modern Icelandic," Language, 34.55-88, (1958).

14

reflected in an article by Martin Joos.[13] In describing a sentence in English in terms of its significant linguistic structure, Joos points out that certain details of intonation and rhythm are relevant to the unit at the level of the sentence. From this point, the utterance or sentence is broken down successively by grammatical criteria into lexical and grammatical subdivisions, down to the level of the morpheme, the minimum unit of meaningful structure. Then Joos considers the possibility that this may be treated as a sequence of syllables, but decides to treat it directly as a sequence of phonemes, there being no significant syllable structuring of morpheme units. As he states: "We may or may not choose to break council into two syllables, but it appears that we can never get any profit out of doing so in our language, so we cut it at once into seven phonemes...by a single act of analysis."[14] In such a statement of language design, the hierarchical aspect of phonological structure is minimized. As an aside, the failure to see any significance in syllable structure may stem directly from considering phonological pattern as a lower level to the structure of morphemes and nothing more than this.

Differences in the emphasis put on hierarchical organization of phonology may be seen in treatments of juncture phenomena. This difference may be seen in a comparison of the view or interpretation of juncture presented by William

[13] Martin Joos, "Description of Language Design," Journal of the Acoustical Society of America, 22.701-08, (1950). Reprinted in Readings in Linguistics, Martin Joos ed., Washington: American Council of Learned Societies, 1957, pp. 349-56. From this reference, it cannot be definitely deduced that Joos would make no reference to phonological groupings in English between the levels of phoneme and sentence. Nevertheless, that such groupings have no place in his summary of language design is considered significant.

[14] Ibid., p. 355.

15

Moulton [15] and one presented by Hockett. [16]   Moulton presents
juncture as a "segmental" phoneme, thus to be treated as a
unit in sequence with and on a par with "segmental" pho-
nemes. [17]   Hockett, on the other hand, in a description of
Chinese phonology, considers junctures of various sorts as
distinguishing characteristics aiding in the segmentation of
the materials into phonological groupings or units of various
sizes.   He thus speaks of macrosegments bounded by macro-
junctures, microsegments bounded by microjunctures, etc.
Pike's inclination for the handling of this sort of data leans
more heavily towards the Hockett interpretation (Pike Lan-
guage 9.6).

0.33. Language consists of emic units.   Language units
are not to be defined as physical entities per se, but as
structurally relevant parts of a system or systems.   To
designate such units, Pike uses the term "emic", in con-
trast to "etic", employing terms adapted from the commonly
used division between phonemic and phonetic descriptions to
a much more inclusive area.   An emic description of lan-
guage describes each unit according to its relation to a total
structure.   This means that all emic units are meaningful, in
the sense at least that they are part of a functioning, cul-
turally significant system.   In that this system or systems
are hierarchically ordered, this characteristic is closely
related to the one previously discussed.   For a fuller dis-
cussion of this, see Pike's Language Chapter 2.

[15] William G. Moulton, "Juncture in Modern Standard German,"
Language, 23.212-26, (1947).   Reprinted in Readings in Linguistics,
Martin Joos ed., pp. 208-15.

[16] Charles F. Hockett, "Peiping Phonology," Journal of the American
Oriental Society, 67.253-67, (1947).

[17] Moulton, p. 213 (Readings in Linguistics).

A description of units as relevant units in a structure is an emic description. Any other description of the same data is etic. However, there are differences in etic descriptions reflecting degrees of eticness, as it were. An etic description may involve the positional variants of emic units, for instance allophones of phonemes. In this case, the etic description is only one stage removed from the description of emic structure. It is in fact a part of an emic description and could perhaps be called sub-emic. Other etic descriptions may have no reference to emic structure at all. An example would be the description of the movements of certain muscles in the production of certain IPA vowels.

One of the most useful applications of the term "etic" as employed by Pike is to a general classificatory framework within which unfamiliar data can be collected and compared, as a means of facilitating analysis into emic units. General articulatory phonetics as employed by field workers in linguistics is such an etic system. One of the major goals of Pike's model is to provide a classificatory etic system for handling grammatical and lexical materials. [18] As in the case of phonetics, the preparation of an adequate etic framework depends to considerable extent on knowledge of a large number of different emically structured systems.

Emic structuring is implicit if not explicit in any description of culturally-oriented behavior, whether within the area of language as such or in a more inclusive cultural framework. An especially clear statement of this was made by Sapir in 1927:

> It is impossible to say what an individual is doing unless we have tacitly accepted the essentially arbitrary modes of interpretation that social tradition is constantly suggesting to us from the very moment of our birth. Let anyone who doubts

[18] Considerable progress is now being made. See Kenneth L. Pike, "Dimensions of Grammatical Constructions," Language, 38.221-44, (1962).

this try the experiment of making a painstaking report of the actions of a group of natives engaged in some activity, say religious, to which he has not the cultural key. If he is a skillful writer, he may succeed in giving a picturesque account of what he sees and hears, or thinks he sees and hears, but the chances of his being able to give a relation of what happens, in terms that would be intelligible and acceptable to the natives themselves, are practically nil. He will be guilty of all manner of distortion; his emphasis will be constantly askew. He will find interesting what the natives take for granted as a casual kind of behavior worthy of no particular comment, and he will utterly fail to observe the crucial turning points in the course of action that give formal significance to the whole in the minds of those who do possess the key to its understanding.[19]

Pike's contribution in this area is that he applies the labels "etic" and "emic" to this difference in a generalized sense, not just in the area of phonetics-phonemics.

0.34. Language is trimodally structured. Each unit in Pike's descriptive model is described in terms of three modes: the feature mode, the manifestation mode, and the distribution mode. The feature mode is concerned with the characteristics, identificational and contrastive, which delimit each emic unit, both from other units of the same order and from units of other orders or levels. The manifestation mode is concerned with varying occurrences of the unit. The distribution mode deals with the distribution of the unit concerned in significant slots in larger units, as well as--in

[19] Edward Sapir, "The Unconscious Patterning of Behavior in Society," in The Unconscious: A Symposium. E. S. Dummer, ed., New York: Knopf, 1927, pp. 114-142. Reprinted in Selected Writings of Edward Sapir, David G. Mendelbaum, ed., Berkeley and Los Angeles: University of California Press, 1951, p. 546.

Pike's treatment, but not here--the distribution within the unit of other smaller emic units.

The TM phoneme /p/ has a feature mode which may be labelled as "front stop consonant". This label distinguishes it from all other phonemes and is a sufficient description of its phonetic characteristics (1.11). The manifestation mode of /p/ includes all its variant occurrences, the phones and allophones of /p/ (1.12). Its distribution mode consists of its occurrences, as a member of various alloclasses of phonemes, in significant slots in syllable structure (1.13).

Every emic unit has these three modes. Also, as noted above in 0.32, there are in Pike's interpretation of hierarchical structure, three hierarchies of emic units--phonological, lexical, and grammatical. The minimum unit in the phonological hierarchy is the phoneme; the minimum unit in the lexical hierarchy is the morpheme; the minimum unit in the grammatical hierarchy is the tagmeme.

Even beyond this, Pike makes a further correlation between the hierarchies and modes. The morpheme is considered as the minimum unit of the feature mode of the syntagmeme (sentence-type) in Pike's Language; the tagmeme is considered as the minimum unit of the distribution mode of the syntagmeme; the phoneme is considered as the minimum unit of the manifestation mode of the syntagmeme. This relationship is not followed through in this present interpretation and will be further discussed in Chapter 6.

0.35. Newness in Pike's Language. The discussion of the above points should indicate that Pike's Language is not completely disjunct with other current points of view in linguistics, as a quick impression of the terminological burden might lead one to suspect. Hierarchical organization is almost universally if not completely universally recognized in language, and extensive application of a hierarchical point

19

of view is being made in phonological studies. Also, lin-
guists in general feel that there is some sort of close tie-in
between language and other human behavior. However, for
many, direct behavior factors are not part of the province of
linguistics proper; and few would try to make as explicit a
formulation of the relationships between language behavior
and other behavior as Pike does. Further, although the
terms "etic-emic" are new with Pike, this sort of distinction
is implicit in all structural studies. In the combination of
these factors, however--the hierarchical ordering of units,
the explicit distinction at several points between an emic and
an etic approach, plus the attempt to move in the direction of
a total analysis of behavioral systems--lies a total approach
in Pike's Language which is quite distinct from other points
of view in linguistics.

The more innovating aspects of Pike's Language, how-
ever, in terms of the actual description of language materials,
are the trimodal structuring of linguistic units and especially
the positing of units of distributional structure. The central
concept of Pike's model is the slot-class correlate, the tag-
meme, both as a unit of description and as a tool of analysis.
It is the thorough-going application of the basically simple
concept of classes of items distributed in significant posi-
tions, and forming with these positions significant units of
structure, that is the core of Pike's theory of language
design.

0.4. Further clarification of method and order of
presentation. In making a first application of a system as
broad in scope as that of Pike's Language, there are many
areas where the application of the principles is open to
considerable personal interpretation. Thus, although the
general framework followed here is that of Pike's Language,
the interpretation of that theory reflected in the actual de-

scription is that of the author. In many respects it builds on the work of linguists other than Pike. There are also some refinements and modifications of Pike's methods in points of detail, and certain changes which affect the model at certain central points. Most important of these are the postulation of a hierarchy of phonotagmemic units mentioned above (0.323), and the redefinition of the distribution mode of units (0.34, 2.13).

In describing units larger than phonemes in his phonological hierarchy, Pike uses the label "hyperphoneme" (Pike Language Chapter 9). Under this sort of definition, syllables, phonemic-words, and phonemic-phrases are all hyperphonemes. The term is not very useful in this description, since various phonological units larger than phonemes will be discussed, and the interest will be as much in distinguishing the various levels of hyperphonemes from each other as from phonemes. It is judged useful, however, to have one term to describe any unit of a particular hierarchy. Thus the term "phonemic" applies, in this study, to any unit in the phonemic hierarchy, whether phoneme, syllable, phonemic-word, phonemic-phrase. Similarly, all units in the phonotagmemic hierarchy are phonotagmemic units, whether phonotagmemes, syllable-types, phonological-word-types, or phonological-phrase-types.

The term "phonological" is used in this study to refer to the total structure encompassed in the phonemic and phonotagmemic hierarchies together. It is also used as a label for units without specific reference to them as phonemic or phonotagmemic units.

In the hierarchical structuring of units, each unit above the smallest unit in a hierarchy has a composition in terms of smaller, lower-level units. In the phonemic hierarchy, syllables are composed of phonemes, phonemic-words of syllables, phonemic-phrases of phonemic-words. In the

21

phonotagmemic hierarchy, syllable-types are composed of phonotagmemes, phonological-word-types of syllable-types, phonological-phrase-types of phonological-word-types. The lower-level units which comprise any given unit are its emic constituents. For instance, the emic constituents of syllables are phonemes, the emic constituents of phonemic-words are syllables, the emic constituents of syllable-types are phonotagmemes, the emic constituents of phonological-word-types are syllable-types, etc.

Each emic unit is composed of its three modes; a description of the modes constitutes a description of the unit. The units of each level of the phonemic and phonotagmemic hierarchies will here be described in these terms. The complete description of the modal structure of all phonological units should comprise a complete description of the phonology of the language. The description made here of TM phonology, although fairly comprehensive in scope, is by no means complete. Two large areas of deficiency will be mentioned in 0.5.

In a detailed description of language according to the hierarchical, trimodal, slot-class approach employed here, there are two ever-present problems concerning the order of presentation. One is that it is not possible to describe the structure without some reference to levels of structure not yet adequately introduced into the description. The other difficulty is that some characteristics are relevant to more than one level of structure. A complete treatment of all levels of structure in all their modes would be highly redundant with respect to such features.

In a Pikean treatment, every level of emic units is closely tied to both the hierarchical layer next smaller than the one under consideration and the layer next larger than the one under consideration. A syllable is composed of phonemes; it also is an emic constituent of units of the next

higher layer, phonemic-words. Phonemes are described in this description with specific reference to syllable structure. Thus some factors involving syllable structure are introduced into the description at the phoneme level, before syllables as such have been described. Likewise, consideration of phonemic-words enters into the description of syllables, and so forth. In such a description, forward reference is not completely avoidable.

Some areas are especially problematical for presentation. Perhaps the most troublesome is that of emic classes of phonemes (1.3). These are relevant at the level of phonemes, since the distribution mode of phonemes is structured in terms of membership in such classes. In this description, the most relevant data concerning distribution of phonemes is involved in the description of emic classes of phonemes. Such classes are also of primary relevance to phonotagmemes, since the filler components of phonotagmemes are alloclasses of emic classes of phonemes. They are also relevant to the structure of syllables, since emic classes of phonemes are fillers of slots in syllable-structure. They cannot be described without some reference to syllables. Here however, since in any case forward reference in this sort of a study is not completely avoidable, the decision has been to treat emic classes of phonemes in the chapter on phonemes and phonotagmemes, as a development from the distribution mode of phonemes.

Redundancy is a problem in this approach because many characteristics have relevance to the structure at more than one point. One example of this is the above-mentioned one of phoneme classes. Another is that within a hierarchy, the distribution mode of a unit at one level is closely tied to the feature mode of a unit at the next level. The distribution mode of a syllable-type describes the significant distribution of these units in phonological-word-types. A major com-

ponent of the feature mode of phonological-word-types is
their emic constituents, which are syllable-types. In this
type of situation, an effort is made to minimize the descrip-
tive redundancy by avoiding the detailed description of the
same phenomena under different headings. However, this
kind of redundancy is not completely avoidable, since such
multiple relevance of linguistic units is part of the nature of
the language system, and the description of this multiple
relevance is part of the description of hierarchical structure
within the model of language being applied here. In that this
description is a test of Pike's model, the fact of this redun-
dancy of relevance should be reflected to some extent in the
description. The particular problem given as an example is
handled by considering most of the detail, not in connection
with the distribution mode of the particular unit, but in its
connection to the feature mode of the higher-level unit.

0.5. Incompleteness of the description. This descrip-
tion leaves TM phonology in need of much more investigation.
The analysis of phonemic-words, phrases, intonational sys-
tem, are all in much need of further work. It would also
probably be fruitful to carry the description farther, includ-
ing at least one more level above phonological-phrase struc-
ture. The incompleteness of analysis is related primarily to
two sorts of deficiencies. The one most keenly felt in the
treatment is the lack of ability to handle the phonetic data
adequately. In the areas of large phonemic units especially,
there is a great need for refinement of phonetic techniques
before adequate descriptions and even completely adequate
definitions of units can be made.

Phonetic characteristics are one base of language, and
especially of phonological units, in actual behavior. The
other area in which this study is most deficient is in the
other directly behavioral aspect of language units, namely in

their meaning. A most basic (though implicit) assumption of Pike's Language is that linguistic units are response units. Therefore any emic unit, whether morphemic, tagmemic, phonemic, or phonotagmemic, should be a testable response unit. In this sense, at least, all phonological units should have meaning. Psycholinguistic tests should be devisable which would demonstrate the response characteristics of speakers of the language to such units. That such responses exist and are testable has been assumed here.

Both the detailed investigation of the phonetic base of the sound system and the response characteristics of the units postulated here are areas in which the author hopes to be able to make further investigations in the future.

0.6. Distinction between phonemic and morphemic hierarchies. Evidence for the distinction between phonemic and morphemic hierarchies of units comes from two sources. One is the type of response behavior indicated in the preceding section. Every emic unit should evoke responses relatable to it as a unit. The responses to syllables as such, for instance, distinguish them as units both from phonemes and from morphemic units. Except for certain general indications this sort of evidence is not used in the present study (see 2.11). The other source of evidence is from lack of cotermination of units determined by phonological (or phonetic) characteristics and units determined by morphological criteria. Evidence of this sort is extensive in TM structure.

Most TM root morphs are monosyllabic. Morphs, however, are not all monosyllabic. There are morphs consisting of more than one syllable, for instance má·ca 'star', and morphs consisting of less than one syllable, as y in tyá·k 'his mother'. More important than this is the evidence of sequences consisting of two syllables and two morphemes, in which the morpheme and syllable boundaries do not coincide.

25

In the form hΛ́· ʔtʌn 'saw', the syllables are /hΛ́· ʔ/ plus /tʌn/. The morphemic segmentation of this form, however, is into {hΛ́· ʔt} 'to saw' and {-ʌn} 'instrumental'.[20] Moreover, the morpheme boundaries of the root vary from occurrence to occurrence. In hΛ́· ʔtp ʔʌcyàm 'I am sawing', the entire root morpheme {hΛ́· ʔt} occurs within a single syllable. In hΛ́· ʔtʌn 'saw', however, part of the root morpheme is a component of a following syllable.

This sort of evidence is to be found at every level of phonological structure. Within the phonemic-word /tΛ̀ʔʌcʌnpícʌm/ 'I already came out', syllable division occurs so that each syllable contains one and only one consonant preceding the vowel (2.111). Segmentation into morphemic-words is as follows: {tʌ} 'already', {ʔʌc} 'I', {npícʌm} 'I came out'.

Even more definitive in separating phonemic-words from morphemic-words is the flexibility of the former with respect to the latter. The morphemic sequence {nΛ́hksp hæ̀ʔævéʔe} 'he's going', occurs in at least three different phonological structurings: as three phonemic-words, /nΛ́hksp hǽʔæ véʔe/, as two phonemic-words, /nΛ́hksp hæ̀ʔævéʔe/, as one phonemic-word, /nΛ́hksphæveʔe/.

The same sort of thing applies at higher levels. Boundaries of phonemic phrases do not always coincide with any given morphemic boundary. There is a correlation between intonation contours and some sort of larger morphemic unit, like a clause or a sentence; yet not all intonation contours end at such major morphemic boundaries.

[20] In examples, slant lines enclose units written phonemically. Braces enclose sequences or units considered as lexical items. Such items may consist of single morphemes or of morpheme sequences. Within slant lines, spaces represent phonemic-word boundaries; within braces, spaces represent tentative boundaries of morphemic-words.

0.7. The centrality of the phonotagmeme. In this description, the phonotagmeme is not to be viewed merely as an accruement to phonemic theory. On the contrary, it is placed at the center of phonological structure and reflected at every stage of analytical procedure and description. In this adaptation of Pike's model, the phonotagmeme assumes an importance in phonological structure equivalent to that borne by the tagmeme in grammatical structure. The basic approach to phonology is in terms of classes of items whose members occur in structurally relevant slots at several hierarchical levels. This principle of slot-class-correlation is thus related not only to the description of classes of items--the fillers of phonotagmemic units--but also to the determination of all significant units in the phonemic hierarchy.

The phonotagmeme applies in phonology to the description of class structure in a manner analogous to that in which the tagmeme applies in grammar. In phonology, as in grammar, there is not a one-to-one correspondence between slots and classes. There are two emic classes of phonemes (consonants and vowels), but three principal slots in syllable structure (onsets, nuclei, termini). For reasons similar to those presented by Pike for tagmemes,[21] this leads to the postulation of slot-class-correlate units, in addition to emic distributional classes of phonemes. These slot-class-correlates are the phonotagmemes of this description.

That phonotagmemes are important in the descriptive analysis of phonemic units in this approach may be seen in the procedural application of slots and classes to the determination of phonemes. There are two basic distributional criteria for the grouping of phoneme-length segments into phonemes, namely contrast and complementation. Contrast

[21]See fn. 9, page 10.

is established basically in terms of lists of sounds occurring in particular slots. In practice, it is usually necessary to specify not only the major slot of syllable structure, but also to limit the slot to be used for contrastive purposes to some particular variant (usually simple) of that slot, and even to the occurrence of particular sounds or classes of sounds in contiguous slots. This fine control over the slots used as a basis for establishing contrast is necessary because the segments being contrasted show the phonetic characteristics of their environments. A set of examples like ʔók 'grand-mother', ʔúk 'dog', ʔúk 'pitch pine', ʔɨk 'toasted', ʔʌ̂k 'stomach lining', ʔák 'skin' illustrate a set of such contrasts. The sum of all possible such groups would contain all the contrastive information about the phoneme system.

Complementation comes into consideration in the assignment of the contrastive members of the various filler classes of these slots to a set of phonemes. The basic criterion in doing this is one of phonetic similarity, applied in conjunction with considerations of symmetry of pattern. In these two applications of slot-class structure are included the basic analytical procedures of the determination of phonemes.

Phonemes and Phonotagmemes

The lowest-level units in the phonemic hierarchy are phonemes. The lowest-level units in the phonotagmemic hierarchy are phonotagmemes. Phonotagmemes consist in significant positions or slots in syllable structure plus classes of filler elements of these slots. As pointed out in 0.7, the inventory of phonemes is determined by contrasts between significantly different sound units occurring in the same slot (contrast), and by comparison of different lists of such elements to give an overall system of phonemic units (complementation).

There are three basic slots or positions in TM syllable structure, and there are three sorts of phonotagmemes. These are labelled <u>Onset</u>, <u>Nucleus</u>, and <u>Terminus</u>, the same labels being applied both to the slots and to the entire phonotagmemes. The labels are taken mostly from Hockett,[1] although his <u>Coda</u> is replaced here by Terminus to avoid confusion between the symbol "C" used as a representation of a phoneme class "Consonants", and its possible use to designate "Coda".[2]

[1] <u>Manual of Phonology</u>, p. 51ff.

[2] Haugen used "D" as an abbreviation for "Coda."

The following lists of examples show the various con-
trasting elements occurring as fillers of the most simple
variants of each of these major syllable-slots. They com-
prise therefore a set of data for phonemic contrasts.

The following list represents the sound units which con-
stitute the fillers of simple variants of syllable onsets,[3]
occurring in a specific restricted position which will later
be described as "in phonemic-word-initial position".

/p/ pák 'dove', pí·p 'grasshopper', pʌ́ʔʌhntk 'soft like
  fur';

/t/ tík 'lizard', tí·nc 'fatness', táhk 'walking stick',
  tɨhps̩ 'rope';

/c/ cík 'species of rodent', cápc 'red', caé̞ʔs̩ 'corn-
  crib', cíʔiv 'squash';

/k/ kɨ́p 'tree', kí·s̩ 'girl', kópk 'mountain', ké̞ʔks̩
  'locks of hair';

/v/ vít 'clothing', ví·ʔt 'to twist', vá·s̩ 'fox', vʌ́k
  'wasp';

/s/ sʌ́· 'sun', s̩ú·m 'net', s̩úʔʋhk 'flavorful', s̩áv
  'waterfall';

/m/ míc 'you', múʔuk 'belligerent', má·p 'he is sleep-
  ing';

/n/ nʌ́k 'paper', náʔav 'old', ní·v 'chile', nú·s̩ 'lazy';

/y/ yá·v 'green corn', yó̞ʔkt 'throat', yʌ́k 'black';

/ʔ/ ʔǽp 'shadow', ʔá·ʔc 'root', ʔé̞·s̩ 'crab';

[3] These are labelled with symbols enclosed in slant lines. repre-
senting phoneme units, even though technically speaking the phonemes
are determined as a result of the lining up of such groups, and not
prior to such alignment.

/h/ hók 'smoke', hú?uk 'tobacco', há·cy 'mule', haép 'there is'.

A more extensive list occurs as onsets of syllables within phonemic-words: /p/ ?apáhk 'jawbone', /t/ ?atú?c 'jaw', /d/ hadú?k 'another', /c/ ?acóvʌ 'answer!', /k/ mukúhk 'all right', /g/ mugú?uk 'relative', hʌgúhk 'shoulder blade', /v/ ?avá?t 'below', /s/ masó?okʌ 'let go!', /ṣ/ nʌsóya 'shirt', /z/ vʌzóy 'embroidered', /m/ ?amá·sʌn 'Spanish language', /n/ kunú·?ks̩ 'holy', /y/ kuyá?as̩ 'surname', /h/ kuhúp 'hat', /?/ ku?ís̩ 'visit'.

A list of simple fillers of terminus slots would include:

/p/ pí·p 'grasshopper', kép 'tomorrow', má·p 'he is sleeping';

/t/ vít 'clothing', hút 'hole', tá·t 'a type of cactus';

/c/ píc 'nixtamal', cá·c 'century plant', kaé·c 'crag';

/k/ tík 'lizard', caék 'simple', mó·k 'corn', mú?uk 'belligerent';

/v/ cív 'water jug', cé·v 'chicken', sáv 'waterfall';

/ṣ/ més̩ 'boy', kí·s̩ 'girl', ?ú·s̩ 'fly', vá·s̩ 'fox', kú?us̩ 'satiated';

/m/ cím 'gourd bowl', kaé·m 'pig', kʌm 'pus', pá?am 'sickness';

/n/ mé·n 'money', ká·n 'salt', ?án 'hot';

/y/ haéy 'fly', má·y 'much', hóy 'flat', hʌy 'brother-in-law'.

A list of simple fillers of nucleus slots includes: /i/ tík 'lizard', /e/ ték 'foot', /æ/ caék 'simple', /ɨ/ kɨp

'tree', /ʌ/ mʌ̂k 'strong', /a/ pâk 'dove', /u/ ʔûk 'pitch
pine', /ʊ/ ʔũ̂k 'dog', /o/ ʔók 'grandmother'.

Contrastive value of vowel length is shown by the fol-
lowing examples: píc 'nixtamal' vs. pí·p 'grasshopper',
caék 'simple' vs. kaé·c 'crag', ték 'foot' vs. mé·n 'money',
ʔɨ̂k 'toasted' vs. mɨ́·n 'sweet potato', ʔʌ̂c 'I' vs. ʔʌ̂·c
'we', tâk 'woman's title' vs. tá·k 'mother', súṣ 'cold' vs.
sú·m 'net', ʔũ̂ṣ 'yesterday' vs. ʔũ̂·ṣ 'fly', ʔók 'grand-
mother' vs. ʔó·k 'seat or base'.

These examples by no means exhaust the various rele-
vant slots and their classes of filler elements. They do
illustrate all the contrastive phoneme units in the language,
however.

1.1. Phonemes. TM phonemes thus are the following:
Consonants /p, t, c, k, v, s, ṣ, m, n, y, ʔ, h, d, g, z/; Vowels /i,
e, æ, ɨ, ʌ, a, u, ʊ, o/. Length of vowel is contrastive and con-
sidered a phoneme. In this description, the term "phoneme"
is applied only to units contrastive within syllable structure.
Stress, although of contrastive significance, is not listed as
a phoneme since its relevance is at the level of the phonemic
word (see 2.21, 3.111, 4.11). Similarly, juncture phe-
nomena are treated at the levels at which they are relevant.

1.11. The feature mode of phonemes. The feature mode
of phonemes consists in identificational-contrastive charac-
teristics which delimit phonemes as a level of emic units
from other levels of emic units, and which also delimit each
phoneme from every other phoneme. In that these features
are identificational, they have reference to a phonetic base.
Pike, in describing an example of the English phoneme /l/,
taken from an utterance of American English, states:

> The feature mode of this acteme (phoneme) includes numerous
> components such as a tongue motion (or tongue position at-

32

tained by prior motions) which brings the tip of the tongue
into contact with the upper gum, while the sides of the tongue
are lowered so that air can pass over them, a position of the
soft palate such that it touches the back wall of the pharynx
so air cannot pass out the nose, a vibration of the vocal
cords for voicing, and a movement of the abdominal muscles
to squeeze the lungs and force air out through the mouth.
(Pike Language 8.22)

The other half of the term "identificational-contrastive"
points up the fact that these features delimit units which
occupy significant positions in a functionally relevant system.
This is equivalent to saying that they have a sort of meaning.
Again from Pike:

Ultimately, every phoneme of a system is contrasted with
every other phoneme of that system by its contrastive fea-
tures...the simultaneous features of a phoneme, then,
whether the phoneme is of a single-segment type or of a
multiple-segment type, are CONTRASTIVE FEATURES of
that phoneme, in that they differentiate it from other pho-
nemes of that system, and a physical component of a phoneme
may be considered structurally relevant to that phoneme, or
to that system of phonemes when, and only when, it can be
shown to thus contrast with its absence in another phoneme
or to contrast with another physical component in another
phoneme. (Pike Language 8.31)

Identificational-contrastive features are for the most
part simultaneous. This is merely to say that the contrastive
features of phonemes occur mostly within single phonetic
segments. However, there is one phonetically complex TM
phoneme /c/, phonetically [ts]. This also contains identifi-
cational-contrastive features which are sequential.

The feature mode of TM phonemes may be described as
follows: for consonants there is a network of contrasts

33

formed by ten simultaneous features and one sequential feature. For vowels there is a network of contrasts formed by six simultaneous identificational-contrastive features.

1.111. Contrastive features of consonants. In the consonant system, four of the ten simultaneous features are features of articulation position: four are features of articulation type. This may be represented as follows:[4]

ARTICULATION TYPE	ARTICULATION POSITION			
	Front	Central	Back	Glottal
Stop	p	T	K	ʔ
Fricative	v	s	Ṣ	h
Nasal	m	n		
Vocoidal		y		

In many cases, the marked intersection of these sets of features delineates a consonant phoneme: /p/ 'front stop consonant', /ʔ/ 'glottal stop consonant', /v/ 'front fricative consonant', /s/ 'central fricative consonant', /h/ 'glottal fricative consonant', /m/ 'front nasal consonant', /n/ 'central nasal consonant', /y/ 'vocoidal consonant'. However, with respect to other marked intersections (T, K, Ṣ), there exists a further contrast between voiced and voiceless phonemes. For these, two additional features are added, voicing and voicelessness. These may be viewed, for charting purposes, as being in another dimension, intersecting the plane of the chart at right angles.[5] There are

[4] However, for consideration of certain marginal sound elements not included here, see 1.5.

[5] This diagrammatic presentation is adapted from one presented by Colin E. Cherry, "Distinctive Feature as the Normal Coordinates of a Language," in For Roman Jakobson, Morris Halle ed., The Hague: Mouton and Co., 1956, pp. 60-64.

significant intersections, however, only at the points of the
chart marked in capital letters, namely T, K, Ṣ. Phonemes
described in terms of these additions are: /t/ 'voiceless
central stop consonant', /d/ 'voiced central stop consonant',
/k/ 'voiceless back stop consonant', /g/ 'voiced back stop
consonant', /ṣ/ 'voiceless back fricative consonant', /ẓ/
'voiced back fricative consonant'. With four features of
articulation position, four of articulation type, plus voicing
and voicelessness, all simultaneous features of all TM con-
sonant phonemes are described, and all contrasts estab-
lished, save one.

To complete the consonant system, one sequential fea-
ture is added to the feature combination 'central stop'. This
is a feature 'sibilant release'. The combination of features
'central sibilant-released stop consonant' defines the pho-
neme /c/, a phonetically complex phoneme.

1.112. Contrastive features of vowels. The simulta-
neous identificational-contrastive features of vowels are
three relative tongue positions from front to back of the oral
cavity and three from high to low, according to the following
chart:

VERTICAL	HORIZONTAL		
	Front	Central	Back
High	i	ɨ	u
Mid	e	ʌ	ʊ
Low	æ	a	o

All vowel phonemes are defined by the intersection of these
features: /i/ 'front high vowel', etc. To complete the in-
ventory of phonemes there should be added /·/, length of
vowel, consisting of one feature, added length of vowel.

Significant contrasts between vowel and vowel plus length are attested for all vowel phonemes.

The terms 'consonant' and 'vowel' included in the above descriptions are not listed as features, although they probably could be. Phonetically, they represent the total system of the first described set of contrastive features as against the second set. They are determined partly in terms of the sum of these phonetic characteristics, and partly in terms of distributional characteristics to be described in 1.2 and 1.3. Their place in this description is as labels for emic distributional classes of phonemes (see 1.3).

1.113. Comments on contrastive features. Names for contrastive features are chosen as labels for relative values within a system of contrasts. They may seem far too general to be of any value in specifying the phonetic nature of individual phonemes. However, they are by definition sufficient and complete definitions of the phonetic nature of phonemes; the features in fact are defined as including the phonetic nature of the phonemes they describe. The combination of features 'front stop consonant' describes the articulatory characteristics of the phoneme /p/ in all its various environments. It is the sum of the distinctiveness of /p/ in all of the environments in which it occurs. In terms of acoustic characteristics, it could be described as the phonetic distinctiveness of all spectrograms of the phoneme /p/.

In such an interpretation of the features, there are two sorts of variation in the phonetic nature ascribed to a feature or feature combination. One of these is a difference in the phonetic import of a feature, depending on the particular combination in which it occurs, that is, depending on the particular phoneme involved. Thus the feature 'fricative', in describing the phoneme /v/ 'front fricative consonant', describes a flat fricative, whereas in describing the pho-

neme /ṣ/ 'central voiceless fricative consonant', it de-
scribes a grooved fricative.

The other sort of variation is that shown in different
variants of the same phoneme. The TM phoneme /v/ varies
from a lenis voiced labio-dental fricative to a somewhat
more fortis voiceless labio-dental fricative to a very lenis
voiced bilabial fricative to a vocoid [w]. The feature com-
bination 'front fricative consonant' includes the phonetic
characteristics of all these variants in their respective
environments.

There are other possible interpretations of the nature
of the features. One would be to set up, besides contrastive
features, other features which are identificational though not
contrastive. These features would describe phonetic char-
acteristics of phonemes not explicitly involved in the set of
contrastive relationships between phonemes. This seems to
be the approach taken by Pike. Another approach would be
to redefine the system of identificational-contrastive fea-
tures in such a manner as to allow for more features, in-
cluding all the more prominent phonetic characteristics of
the phonemes as features. This would result in a higher
degree of differentiation of features and involves a sacrifice
of the contrastive characteristic of the feature system.

In the diagrammatic manner of looking at the relationship
of the voiced-voiceless contrast to the phonemic system
presented on p. 34, significant intersections of this con-
trast with the plane of other feature combinations were
posited only at the points marked by capital letters T, K, Ṣ.
The phoneme /t/ includes a feature of voicelessness, since
there is a contrast t//d, but /p/ does not. By this sort of
interpretation it is implied that in the remainder of the sys-
tem there is no significance attached to voicelessness and
voicing as "features". However, phonemes not affected by
this contrast nevertheless have some variants which are

phonetically voiceless, others which are voiced. The phonemes /p/ and /c/, for example, are voiceless except when occurring syllable initial following a nasal within a phonemic-word. The phoneme /v/ is voiced except in certain syllable-final clusters and syllable-finally following simple vowels other than /a/.

It would be possible to interpret voicing and voicelessness as noncontrastive or conditioned features of certain members or variants of these phonemes. The interpretation presented here, however, treats them as not being part of the labelled feature system of the phonemes in question at all. Yet, what of the fact that for some of these phonemes not involving a voiced-voiceless contrast voiced allophones predominate, whereas for others of them voiceless allophones are more basic? Perhaps this implies that voicing and voicelessness, though not contrastive, are nevertheless associated with phonemes as identificational features, occurring in a majority of forms of the unit. The answer given here is that the phonetic definition of combinations of features involves the phonetic characteristics of voicing or voicelessness when involved as part of the actualization of a phoneme in particular environments. That is, the phonetic meaning of 'front stop consonant' includes the fact that the phoneme thus described has voiced allophones when occurring syllable-initial following a nasal within a phonemicword.

A situation somewhat similar to that affecting the voicedvoiceless contrast affects the phoneme /n/. In the nasal series of consonants, there is no contrast between a central and back point of articulation, although the phoneme is actualized by both dental and velar allophones. In our system of nomenclature, the sound is labelled a central nasal (velar allophones are low in frequency and restricted in occurrence).

1.114. The phoneme /y/. There are two special char-
acteristics of the phoneme /y/. One is that it is the only
consonant or vowel defined in terms of only one contrastive
feature. (The term 'vocoidal' is chosen to describe this
feature because it is a phonetic term, parallel to the other
labels used to describe features and phonemes. The more
common alternative term, 'semi-vowel' is more reflective of
distributional characteristics than of phonetic ones.) Its
second special characteristic is that sequences of another
consonant plus /y/ pattern very much as single phoneme
units, so that there is considerable evidence for a series of
palatalized phonemes. This palatalizing component occurs
in combination with all consonant phonemes but /y/. As will
be pointed out in 1.3, the distribution of such combinations
in syllable structure is equivalent to the distribution of sin-
gle phoneme units. There are, however, two reasons for
not positing such a series of phonemes. One is that it would
almost double the number of consonant phonemes. The other
is that the /y/ in these forms is almost always a separate
morpheme or the historical remnant of a morpheme. None-
theless, it would be possible to set up palatalized consonant
phonemes, which would contain a sequential feature of palatal
offglide. What is now phonemicized as /ty/ would be treated
as /t^y/, and would consist of the simultaneous contrastive
features of /t/ (voiceless central stop consonant) plus a
sequential feature of palatal release. What is now phonemi-
cized as /cy/, [tš], would then consist of a feature com-
bination 'central stop' plus a sequential feature of sibilant
release plus another sequential feature of palatal offglide.
Distributionally there would be some advantages to such an
approach.

1.115. Restrictions in contrastiveness. The contrasts
between certain groups of phonemes is sharply restricted in

terms of the positions in which the contrasts occur and in terms of the number of forms in which actual evidence of contrast is attested. For the phonemes with the contrastive feature of voicing, for instance, the contrasts occur in only certain environments. Of the three significant positions described in the list of examples given on pages 30-32, the voiced-voiceless contrast appears in only one of the positions. Moreover, the number of forms in which actual contrasts are attested is quite small. The contrast between /s/ and /c/ is similarily restricted.

Also, the set of contrasts showing nine vowel qualities is characteristic only of stressed syllables. In unstressed syllables, there are only six vowel qualities attested. There is no contrast attested between /u-ʊ/, between /ɨ-ʌ/, and between /e-æ/ in unstressed syllables.

1.12. The manifestation mode of phonemes. The manifestation mode of a phoneme includes all its occurrences-- its variants--which are the phones and allophones of the phoneme. Since each phone is a behavioral act, there is a sense in which it is not possible to define all the phones, since the number is unlimited and no two of them can be assumed to be the same. However, since the phonetic characteristics of these acts normalize around certain values, and since these normalized values can be correlated with distributional characteristics, it is possible to adequately describe the phonetic characteristics of these normalized distributional classes of phones, [6] the allophones of the phoneme.

In this description of TM phonology, phonetic descriptions of the various manifestations of the phonemes are made in terms of gross articulatory descriptions of the sort most common in phonemic descriptions. Thus [p], an allophone of /p/, is described as a voiceless relatively unaspirated bila-

[6] In this sense it is appropriate to look at a phoneme as a class of allophones, though this characteristic will not be dwelt on in this study.

bial stop, for example. These descriptions are not detailed;
it would be possible and appropriate within the framework of
Pike's system to make more detailed and more objective pho-
netic descriptions. This could be done either by the use of
acoustic analysis, or by a more detailed articulatory ap-
proach, this again either by means of laboratory or of field
methods. However, it is felt that the present description is
in general reliable and sufficiently detailed to show the
nature of the phonetic variants of TM phonemes and to show
the area of relevance of the manifestation mode within Pike's
Language.

1.121. The allophones of consonants. The principle
allophones of stop phonemes are as follows:

a. As simple onsets of syllables, /p,t,c,k/ are usually
manifested by relatively unaspirated voiceless stops at bila-
bial, dental, alveolar and velar points of articulation re-
spectively. /c/ has sibilant release. Illustrations: /p/
pǽhkṣ 'peach', hǽpʌkcè'c 'there is'; /t/ tívè'e 'what
(emphatic)', vùstṷhtʌk 'seven'; /c/ cí·hn 'pine', kóhcʌn
'manner of speech'; /k/ kumé·n 'rich man', mukṷhk 'all
right'.

b. As simple onsets of syllables, intervocoidally[7] within
phonemic-words, /d,g/ are manifested by lenis voiced fri-
catives at dental and velar points of articulation. Illustra-
tions: /d/ hadṷ'k [haðṷ'k] 'another', ná·ydʌm [ná·yðʌm]
'alone'; /g/ mugṷ'uk [muǥṷ'uk] 'relative', pígʌk [píǥʌk]
'round'.

c. As simple onsets of syllables in combination with
/y/, /p,t,k/ are manifested by allophones assimilated to-
wards palatal articulation. The effect is most marked in the
case of /c/; the sequence /cy/ is phonetically [tš]. cyé·v
[tšé·v] 'his chicken'.

[7] The condition is stated here in terms of phonetic criteria, since
/y/, although a vocoid is not a vowel.

d. As complex onsets of syllables--that is in clusters following nasals--or as simple onsets of syllables following, within a phonemic-word, syllables terminating in a nasal (this is the limitation which introduces the word "usually" above under a)--/p,d,c,g/ are manifested by voiced stop allophones. Illustrations: /p/ [b] vimpít [vimbít] 'backwards', mpáhk [mbáhk] 'your bone'; /d/ mdá·k 'your mother', hᴧndɨ́hps 'a species of insect'; /c/ ncᴧ́ʔᴧ [ndzᴧ́ʔᴧ] 'my older sister', mɨ̀ncáʔp [mɨ̀ndzáʔp] 'a town name'; /g/ mgaé·m 'your pig', hàmgá· 'tiger'. Sub-paragraphs (b) and (d) describe the total allophonic distribution of voiced stops /d/ and /g/.

e. As simple termini of syllables, /p,t,k/ are manifested by allophones which are either aspirated or not perceptibly released--that is either unreleased or released unperceptibly into a following phoneme. At the end of a phonemic-word, only the aspirated allophones occur. Within phonemic-words, both occur. Preceding certain consonants--/ʔ,s,h/ as onsets of following syllables--only unaspirated allophones occur. Preceding some other consonants, /v,m,n/, there seems to be free variation between aspirated and unreleased allophones. Preceding another stop, simple termini of unstressed syllables are unreleased, simple termini of stressed syllables (ˋ or ˊ) are aspirated. Illustrations: aspirated allophones; /p/ cáhp 'sky', kɨ́p-káʔahk 'mamey'; /t/ vɨ́·ʔt 'fence', ʔítkúhk 'in the middle', /k/ páhk 'bone', tékká· 'big toe'; unreleased allophones: /p/ kòpmáhtk 'eldest son', tìpʔó·ʔkhup 'he is cold'; /t/ hòtʔáʔnᴧn 'rage', /k/ yaktíkᴧc 'change', véhksᴧn 'griddle'.

f. As members of complex termini, /p,t,k/ are also manifested by aspirated and unreleased allophones. For phonemes occurring as last member of complex termini, the above distribution (e) of allophones applies. For nonfinal

members of clusters, aspirated allophones occur preceding stops; unreleased allophones occur elsewhere.

g. /c/ in all occurrences is manifested by allophones with sibilant release. Noticeable difference between aspirated and unreleased allophones in termini does not apply.

The principle allophones of /v/ are as follows:

a. As simple onsets of syllables, /v/ is usually manifested by a lenis voiced labio-dental fricative. Illustrations of this are: vít [vít] 'clothing', vá·s [vá·š] 'fox'. However, there are limitations to this. Intervocalically even more lenis variants occur, varying toward a bilabial articulation and even to a vocoidal allophone [w]. Illustrations are: ʔavá?t [ʔavá?t/ʔaƀá?t] 'below', kuvút [kuvút/kuƀút/kuwút] 'to go up'. The vocoidal allophone also manifests a simple onset following a nasal in a preceding syllable, ʔʌcʌnvídʌt [ʔʌcʌnwídʌt] 'I wander'.

b. As complex onsets of syllables, it is manifested by the vocoidal allophone mentioned above. nvítp ʔʌc [nwíthph ʔʌc] 'I am wandering'. The sequence nv in this environment tends towards voicelessness.

c. As simple termini, /v/ is manifested by the allophone [v] following nuclei of shape-type V·, V?V. Illustrations are: yá·v [yá·v] 'green corn', né?ev [né?ev] 'wall'. Following nuclei of the shapes V, V?, except for the vowel /a/, it is manifested by a voiceless allophone [f]. cív [tsíf] 'water jug'. As a simple terminus following /a/, it occurs as [w], sáv [šáw] 'waterfall'.

d. As a member of complex termini, the allophone [f] manifests the phoneme /v/. kǽp?asǽ?vst [kǽp?ašǽ?fst] 'wood shavings'.

For the phoneme /s/ there are two major allophones. One is a voiceless retroflexed alveo-palatal grooved fricative, the other is a somewhat fronted and not retroflexed variant. The fronted variant occurs as a manifestation of

43

the sequence /sy/. Illustrations are: sʌ̆· [šʌ̆·] 'name',
syʌ̆· [šʌ̆·] 'his name'.

The phoneme /z/ has only one allophone, a voiced
retroflexed alveo-palatal sibilant. This allophone, and
therefore this phoneme, occurs only intervocalically within
phonemic-words and following nasals within phonemic-
words. Illustrations: tímzʌ̆· 'what's your name?', vʌzʌ́p
'how much'.

The phoneme /s/ has only one allophone, a voiceless
post-dental sibilant. It occurs intervocalically within
phonemic-words, as a simple terminus preceding a stop
within a phonemic-word, and in the complex termini /vst/
and /nst/. Illustrations: masóʔokʌ 'let go!', mí·stu 'cat',
nàspáhk 'neck bone', kɨ́pʔasǽʔvst 'wood shavings', ʔa-
yǽ·ʔnst 'flame'.

The principle allophones of nasal phonemes /n, m/ are
as follows:

a. As simple onsets of syllables and as simple termini
except following /h/, the nasal phonemes are manifested by
voiced allophones. /m/ is bilabial; /n/ is post-dental
except preceding a velar stop, in which case it is manifested
as a velar allophone. This qualification pertains to all oc-
currences of /n/ within phonemic-words. Illustrations:
mɨ́c 'you', nʌ̆· 'water', kæ̀·mnʌ̆· 'hog-wash', tʌnʔɨ́s 'I
already saw', cìngávus [tsìŋgávuš] 'a species of bird'.

b. In combination with /y/, /n/ is manifested as an
alveo-palatal nasal allophone. Illustrations: nyɨ́hks [ñɨ́hks]
'he went', vyáʔany [vyáʔañ] 'he said'.

c. As complex onsets, nasals are voiceless preceding
/h/, otherwise voiced. (Complex onsets of syllables consist
only in sequences of nasals plus another consonant.) Illus-
trations: mhá·cy [Má·cy] 'your mule', nhʌ́hp [Nʌ́hp] 'my
nose', mdá·k [mdá·kʰ] 'your mother'.

d. As simple termini following /h/, and as members of

44

complex termini of more than two members, voiceless allophones occur. Illustrations: ví·hn [ví·N̥] 'eye', ʔáhntk [ʔáNtʰkʰ] 'cave'.

e. As members of complex termini of only two elements, voiced allophones also occur. Illustration: tʌ̃kví·nk [tʌ̃kví·ŋk] 'porch'. Contrast ví·hnk [ví·N̥k] 'strange'.

f. There is a tendency toward devoicing of allophones in phrase-final position. This is distinct, however, from completely voiceless allophones which occur following /h/ in termini.

The principle allophones of /ʔ/ are as follows:

a. As simple onset of syllables, and in nucleus expansion variants of the form Vʔ, it is manifested as a relatively discrete stop allophone. Illustrations: ʔít 'land', caé̜ʔs̜ 'corncrib'.

b. In the nucleus expansion variants of the forms VʔV and V·ʔ, it is manifested as laryngealization of different portions of the vocoid span. The contrastive difference between these two expansion forms depends on the area of the vocoid span in which the laryngealization is concentrated. In the form VʔV the greatest laryngealization occurs towards the central part of the duration of the vocoid, whereas in V·ʔ it occurs towards the end of that span. Illustrations: mú̜ʔuk 'brave', mú·ʔc 'adobe bricks', há·ʔk 'crow', hú̜ʔuk 'cigarette'.

c. In complex onsets, /ʔ/ is manifested as laryngealization of the early part of the vocoid span. This laryngealization affects a relatively early portion of the vocoid, but does not begin until after the onset of the voiced portion of the syllable concerned. In the form nʔá· 'my mouth', the phonation of /n/ is relatively clear. The laryngealization characteristic has its onset after the voicing characteristic of [n] has already begun. This allophone also occurs in combination with /y/, in which case the sequence begins

45

with a relatively clear vocoid quality characteristic of /y/ and the laryngealization occurs during the vocoid glide from this quality to the following vowel. Illustrations: mʔúc 'your younger sibling', yʔúk 'his dog', nʔáhcy 'my older brother'.

The principal allophones of /h/ are voiceless and voiced light glottal fricatives. The manifestations of this phoneme show the vocoidal resonances of adjacent vowels. Inter-vocalic occurrences within phonemic-words tend towards voicing. Sequences of /h/ plus /n, m, y/ are manifested by voiceless segments [N], [M], [Y]. Illustrations: hʌ·hn [hʌ· N] 'fire', túhʌn [túhʌn/túȟʌn] 'rifle', cí·hn [tsí· N] 'pine', ʔànyikóhm [ʔàñikóM] 'Totontepec', pú·hy [pú· Y] 'thigh'.

Most of the principal allophones of /y/ have been dis-cussed in reference to other phonemes with which it occurs in a special sort of close-knit sequence. It also occurs as a simple onset or terminus, or as the first member of a com-plex terminus, manifested as a high front unrounded non-syllabic vocoid. Illustrations: yóʔkt 'throat', hóy 'level', pʌyc 'cornstalk'.

1.122. Vowel allophones. In stressed syllables, some TM vowels, (ɨ, ʌ, a, e), show considerable variation in allo-phones. For the others the variation is slight. The phonetic characteristics of the latter group may be described in general terms as follows:

/i/ is manifested by vocoid allophones which are high front unrounded.

/æ/ is manifested by vocoid allophones which are low front unrounded.

/u/ is manifested by vocoid allophones which are high back rounded.

/ʋ/ is manifested by vocoid allophones which are higher than mid back rounded [o], but not as high as the sound of English 'good'. For some speakers, in some phonemic environments, notably as V? expansion variants of nuclei (1.3), /ʋ/ is manifested as a glide [ɛʋ].

/o/ is manifested by allophones which are higher than low back rounded [ɔ], but not as high as [o].

Of the four vowels showing appreciable variation in allophones, three are central vowels /ɨ, ʌ, a/. These have allophones varying from quite backed variants, approaching [ɨ], [ë], [ɒ], to fronted allophones approaching [ɪ], [ɛ], [æ]. However, there is no neutralization of contrast between front and central vowels. Fronted allophones of /ʌ/ do not intersect with those of /e/ in any given environment. The predominance of allophones tend toward the backed positions; adjacent to glottal and bilabial consonants, as well as adjacent to velar consonants, which would be expected to exert a backing influence, backed allophones occur. The most fronted allophones tend to occur adjacent to /c/ and /y/, as in cyʌ́hkp 'he desires'.

Allophones of /e/ vary from a relatively close mid front unrounded vocoid [e] to a somewhat more lax variant [ɛ].

Allophones of vowels vary somewhat between stressed and unstressed syllables. The lack of contrast between /ʌ/ and /ɨ/ is reflected in occurrences of vocoids phonetically intermediate between these phonemes in unstressed syllables. There are also differences between stressed and unstressed allophones of vowels. Phonemically-short vowels occurring in the centers of phonemic-phrases are usually longer in actual duration than phonemically-long vowels in syllables with reduced stress.

47

1.123. Threshold problems. The description of the manifestation mode of phonemes is considerably complicated by the gradual change in the phonetic nature of the phonemes with respect to different degrees of stress on the syllables in which they occur, and with respect to changes in the rate of speech. These two are related, for one characteristic of rapid speech is that there are more unstressed syllables than in slower speech in TM. As the rate of speech increases, and as syllables are progressively less stressed, the perceptual distinctness of individual phonemes decreases. There are many sequences in TM in which it is difficult to ascertain whether a given phoneme has occurred or not. This problem is not dealt with in this study. The description deals only with the phonetic characteristics of relatively discrete segments.

1.13. The distribution mode of phonemes. The distribution mode of any unit consists in its patterned occurrence, actual and potential, in higher-layer units in hierarchical structure. For phonemes, there are two important characteristics of this distribution. The first is that phonemes are distributed in units of two distinct hierarchies. Phonemes have a relevant distribution in larger units in the phonemic hierarchy, syllables primarily. They also have a relevant distribution in units of the morphemic (lexical) hierarchy, that is in morphemes. The interest here is almost completely confined to the distribution of the phonemes in larger phonemic units; no detailed account of the distribution of phonemes in morphemic units is made. If this were done, it would be treated under the heading of Morphophonemics, defining the term in the sense in which it is used by Hockett.[8] Some distinctions between the distribution of phonemes in the two hierarchies will be pointed out in 1.4.

[8] Manual of Phonology p. 15.

The second major characteristic of the distribution mode of phonemes is that they are members of emic distribution classes of phonemes. The distribution of a phoneme is described as membership in a number of distributional allo-classes and sub-alloclasses of phonemes. The distribution mode of the phoneme /p/ in TM is described as membership in an emic class of phonemes C (Consonants) (1.32). It is a member of simple alloclass groups C1 and C2 (1.321), which are filler components of simple variants of onset and terminus phonotagmemes respectively. It also occurs as a member of various expansion alloclasses, which are filler components of expansion variants of phonotagmemes, and as a member of various sub-alloclasses (1.322). The basic building blocks for emic class structure are lists of phonemes occurring in particular significant syllable-structure slots. These lists comprise alloclasses and sub-alloclasses of emic classes of phonemes. From the membership of these various filler classes--these alloclasses--emic classes of phonemes are derived. The most distinguishing characteristic of the phonotagmemic approach is that the primary subdivisions of such emic classes of phonemes are not the phonemes as such, but the positional alloclasses of phonemes.

This approach to distributional structure is quite distinct from most other descriptions of the distribution of phonemes. This is true even by comparison with other descriptions which make use of distributional classes. The main difference is that most other descriptions consider phoneme classes as composed directly of phonemes. The classification of such descriptions is a method of classifying phonemes according to the total distribution of each phoneme. Pike's approach takes the lists of phonemes occurring in slots in syllable structure as basic, and considers the emic classes of phonemes as combinations of such classes.

To illustrate the difference between these two ap-

49

proaches, TM phonemes are presented here in broad out-
line according to two analyses. The first is modelled after
distributional analyses in C. F. Hockett's Manual of Pho-
nology.[9] This is compared to the analysis in terms of a
Pikean description of emic classes of phonemes, presented
to a comparable degree of detail, (see Pike Language 8.62).

Hockett's views as expressed in his Manual of Phonology
were taken as the basis of comparison, since (a) they are
quite similar to those of Pike in many respects, especially
in the hierarchical structuring of phonological units, and (b)
his method of classification is quite clearly stated.

A broad classification of TM phonemes according to the
approach reflected in Hockett is:

Consonants: p, t, k, c, v, s̩, m, n, d, g, z̩, s
Vowels: ə, æ, ɨ, ʌ, a, u, ʊ, o
Semiconsonants: ʔ, h
Omnipotents: i
Covowel: · (Vowel length)

Class-determining distribution would be defined as follows:
Consonants are defined as phonemes which occur only as on-
sets and/or codas (my termini) of syllables. Vowels are
defined as phonemes which occur only as nuclei or as parts
of nuclei. Semiconsonants are defined as phonemes which
occur as onsets, and in special forms of nuclei, along with a
vowel or vowels. Omnipotent is a class of one phoneme which
occurs as a complete onset, as a complete coda, and also as
a complete nucleus as well as in various complex onsets and
nuclei. Covowel is a class of one phoneme which occurs
following the vowel elements of nuclei, and before the glot-
tals which occur as part of nucleus structures. By more
restrictive definition of the distributions, these classes
could be broken down further, even to the point of consider-

[9]p. 74ff.

ing every phoneme to constitute a class by itself. Even the distributions of /ʔ/ and /h/ are not completely the same; there are in TM syllable nuclei of the shape VʔV, but not of the shape VhV.

A broad classification of TM phonemes into Pikean emic classes of phonemes is:

Consonants: p, t, c, k, v, ṣ, m, n, y, d, g, ẓ, s, ʔ, h

Vowels: i, e, æ, a, ɨ, ʌ, u, ʊ, o

Vocalic Increment: · (Vowel length)

In addition there is an emic sub-class of glottals, /ʔ/ and /h/. The emic class of consonants is determined by two groups of alloclasses, those occurring in onset position, and those occurring in terminus position. The onset alloclasses C1 contain the entire list of consonants, while the terminus alloclasses contain that list minus /d, g, ẓ, ʔ, h/. Alloclasses of vowels in stressed syllables do not vary appreciably. The emic sub-class is composed of the list of phonemes occurring in certain slots in expansion variants of nuclei. The membership of this class is /ʔ/ and /h/.

At first glance, it may seem that the differences between these two classifications are slight. The Hockett-like classification sets up five classes of phonemes, the Pikean classification three; but the additional emic sub-class in the Pikean classification seems equivalent to the class of semi-consonants in the Hockett-like classification. (At any rate, its membership is the same). Each classification has a class of consonants, a class of vowels, a class of covowel or vocalic increment, plus the class or sub-class composed of /ʔ/ and /h/. The fifth class in the Hockett-like approach is composed of the omnipotent /i/. The basic difference between the two classifications is shown in the postulation of this class and in its relationships to the classes of vowels and consonants.

The class of omnipotent reflects a difference in pho-

51

neme inventory--hence in phonemic analysis--between the
two studies or classifications.   This difference is in itself
minor; however, it leads to the major distinction between the
classifications.   The omnipotent /i/ in the Hockett-like
treatment has both vocalic and consonantal allophones.   The
phoneme itself is classified neither as a vowel nor as a con-
sonant, but as a class by itself, by virtue of the very fact
that it has both consonantal and vocalic distribution.   In the
Pikean classification, on the other hand, this is treated as
two separate phonemes, a consonant /y/ and a vowel /i/,
which belong to separate classes.   This complete separation
between consonant and vowel classes has been a basic point
in Pike's procedures for phonemic analysis at least since the
publication of <u>Phonemics</u> in 1947.[10]   However, it would be
possible to present a Pikean view of the emic structure of
classes of phonemes without this particular bit of phonemic
interpretation; that is, [y] and [i] could be considered as
allophones of one phoneme /i/.   In that case, the phoneme
/i/ (representing /y/ and /i/ in this description) would, in
a Pikean classification, be a member both of the consonant
class and of the vowel class.   Whereas such a phoneme be-
longs, in the Hockett-like classification, to neither class of
phonemes, in the Pikean classification it would belong to
both classes; the reinterpretation of the phonemic status of
/y/ and /i/ would not result in the establishment of a class
of omnipotents.

The same sort of difference is seen further in the case
of the Hockett-like semiconsonant class.   These phonemes
are not listed in the class of consonants, since their total
distribution is different from the items listed in that class.
By virtue of their occurrence in expanded variants of nuclei,
they comprise a separate class, distinct from consonants,

[10] Kenneth L. Pike, <u>Phonemics</u>: a Technique for Reducing Languages
to Writing, Ann Arbor. Michigan: University of Michigan Press. 1947.

though some of their environments are shared with consonant phonemes. This is another illustration of the principle of classification in which the primary concern is the grouping of phonemes together on the basis of similar total distribution. In this classification system, at any one level of focus for classification, each phoneme is a member of only one class.

The Pikean classification, in contrast, includes /ʔ/ and /h/ as members of the consonant class of phonemes, this by virtue of their occurrence in consonant slots. They are also treated as an emic sub-class by virtue of their additional distribution as the filler class of certain expansion slots in nuclei. This points up the basic premise of the Pikean classification that comparable fillers of the same slot are always members of the same major distribution class, even though this considers some units as members in more than one emic class.

The basic difference in approach may be further evidenced as the classifications are carried out in terms of more restricted environmental conditions. In the Hockett-like approach, there is a change in class-membership as the sort of distributional evidence used in the classification is varied. The class of which /p/ is a member is not the same in the case in which the distribution treated is relative to particular following vowels, as it is in the case in which the distribution treated is relative to syllable nuclei in general. In the Pikean classification, on the other hand, since the emic classes are combinations of positional variants which are in themselves classes (alloclasses of emic classes), the introduction of more detailed and local conditioning factors results in sub-classes which are easily related to the overall class structure as sub-variants of major distribution classes.

Moreover, the classes, alloclasses, etc. set up thusly

53

are closely related to the composition of phonotagmemes and phonotagmeme variants in syllable structure. It is this relationship to the total system which makes the Pikean classification most adaptable to the present classification of phonemes. The fact that the alloclasses of emic classes of phonemes are directly components of phonotagmeme units is the largest argument in favor of the analysis into such a system of classes, and outweighs the apparent cumbersomeness of the system in describing some of the gross features of phoneme classification.

The Pikean classification is also followed here for the reason that is taken from Pike's Language, and our primary purpose is to apply and to test the model of language structure found there. Changes made in the model are made only for what is, in the judgement of this writer, greater overall consistency and utility.

In the preceding pages, the discussion has centered on classes of phonemes. The distribution mode of phonemes includes also the distributional characteristics of individual phonemes. However, the connections between the class structure and the distribution of the phoneme units as such may be seen readily. In the Hockett-like classification, the distribution of any phoneme is stated merely by stating the class to which it belongs; this describes the distribution, since the class is determined by similarity of distribution of its members. In the Pikean approach, the distribution of the particular phoneme is described, in the manner done above for TM /t/, in terms of the various alloclasses, classes, emic sub-classes, etc. of which the phoneme is a member.

The relationship of the classes of emic units to the distribution of individual units in phonology may be seen by comparison to the same sort of relationships in morphological structure. It is relevant in morphemic studies to consider the distribution of each morphemic unit. (As in the case of

54

phonemes, it will be found that the total distribution of any morpheme does not coincide with that of any other morpheme.) In morphemic studies, however, the major share of attention is generally placed on the determination and description of major distribution classes of morphemic units rather than on the distribution of individual morphemes per se. Moreover, the most relevant information concerning the distribution of the individual morpheme is most clearly stated in reference to its class-membership. A great deal of the distributional characteristics of TM {hấhp} 'nose' is contained in the identification of it as a noun. Likewise, the primary distributional characteristics of /n/ are described in stating that it is a consonant, and then that it is a member of certain positional variants, C1, C2, etc., of the emic class of phonemes called consonants.

The Pikean approach to classification of phonemes is very congenial to the overall approach to tagmemic units, since the basic distributional variants of the emic classes of phonemes are also the filler components of phonotagmemes. This does not seem to be an absolutely necessary connection within the general application of the tagmemic principle, however.

1.2. Phonotagmemes. There are three groups of phonotagmemes in TM phonology. These are onset, nucleus, and terminus phonotagmemes. Onset phonotagmemes are further distinguished into Onset I and Onset V. Nucleus phonotagmemes are Nucleus I, Nucleus III, Nucleus IV. Terminus phonotagmemes are Terminus I, Terminus II, Terminus IV. Each phonotagmeme is a significant or emic constituent of a particular syllable-type or types (2.2). The Roman numerals which are part of each phonotagmeme label refer in each case to the lowest-numbered syllable-type of which the phonotagmeme under consideration is an emic constituent.

Some of the phonotagmemes are constituents of more than one syllable-type. Thus Onset I is a constituent of Syllable-types I-IV.

1.21. The feature mode of phonotagmemes. The feature mode of phonotagmemes consists in identificational-contrastive features which distinguish phonotagmemes from all other units of all other hierarchies in TM language structure, as well as from other levels of phonotagmemic units, and which distinguish each phonotagmeme from every other phonotagmeme in the language. Units of the phonotagmemic hierarchy are distinguished from units of other hierarchies in that the formal aspects of their feature mode consist in (a) significant slots in phonological structure, and in (b) classes of phonemic units which comprise the fillers of those slots. Phonotagmemes, the lowest level of phonotagmemic units posited in this description, are distinguished from other phonotagmemic units in that the slot components are significant slots in syllable level structure and that the filler classes are allo-classes of emic classes of phonemes. (The comparable structure for syllable-types is composed of emic slots in phonological-word level structure plus filler classes which are composed of syllables. Syllable-types also have an internal composition--an emic constituency--of phonotagmemes as part of their feature mode.)

Phonotagmemes are differentiated from each other in terms of differences of slot and in terms of differences in filler class. However, to describe the differences in the various phonotagmemes, it is convenient to state this in a slightly different manner. Viewed thusly, phonotagmemes are distinguished from each other by differences in relationship to syllable-structure, by difference in filler class components, and by differences in expandability. Differences in expandability relate directly to the characteristics of dif-

56

ferent slots and different classes; the difference between this and the previous statement is that whereas the point of expandability has to do with both slot and class, it enters so prominently into the description of the phonotagmemes that it is convenient to assign it a special place in the descriptive framework.

Considerations of all these characteristics enter into the distinction of the three groups of phonotagmemes (onsets, nuclei, termini) from each other. Onsets in general are distinguished from nuclei and termini by their position in syllable structure (they are obligatory in all syllable-types and occur initially in syllables), in terms of their filler classes (this difference is sharp in distinguishing the fillers of onsets and termini from those of nuclei, less so in distinguishing between onsets and termini), and in terms of expandability (onsets, nuclei, and termini all have characteristic and distinctive patterns of expansion). At the level of distinguishing between different phonotagmemes in each of these groups, that is for instance between Onset I and Onset V, the formal difference is largely one of expandability. Terminus I, for instance, admits of expansions to as many as five consonant positions, whereas Terminus IV admits of only simple filler elements.

There is a close connection between the filler classes of phonotagmemes and the emic class structuring of phonemes. The filler classes are alloclasses or positional variants of emic classes of phonemes. The structure of classes of phonemes presented in 1.3 is to great extent a subdivision of the description of phonotagmemes. However, it is not included here for two reasons. One is that the treatment of the class structure is extensive in itself and merits a separate section just because of its size. The other is that, whereas there is a definite connection between the structure of emic classes (especially as presented here) and

the composition of phonotagmemes, this connection is not complete to the extent that the classes can be equated directly to phonotagmemes. There are two phonotagmemes whose fillers are taken from the same emic class of phonemes, namely onsets and termini, both of which have alloclasses of the consonant class as their fillers.

Terms such as "Onset I" are used in this description as labels for phonotagmemes. The slot of the phonotagmeme is referred to as "Onset I slot"; its filler, when explicitly mentioned, is in its simple form referred to as C1. In Pike's application of tagmeme formulas, the labels applied to the slot-plus-class correlation units include a designation for the filler component as well as one for the slot component. In the application made here, phonotagmemes are usually referred to by simple labels, such as that of "Onset I", with no explicit reference to the filler class. "Onset I" thus designates the whole phonotagmeme, including both slot and filler class.

Up to this point, the fillers of the various phonotagmemes have been referred to by designations which indicate simple filler elements. The labels used have been C1, V, C2. Actually one of the more prominent characteristics of phonotagmemes is their expandability. The phonotagmeme Terminus I, for example, has many complex or expanded variants as well as simple ones. To describe such expanded variants, two types of formulizations are employed here. In the first of these, the slot-class characteristics of such expanded variants are shown in a general formula designed to show the structure of the phonotagmeme in all its occurrences. Such a formula is:

Terminus I = + C2a $\pm$ C2b $\pm$ C2c $\pm$ C2d $\pm$ C2e

This formula describes all possible combinations of syllable-final elements. (It also could be viewed as generating a

large number of non-occurring clusters, unless limited in some such way as that presented in 1.3.)

The second sort of formulization shows only the portions of this previous formula occurring in particular actualization of the phonotagmeme in question, or in a group of similar actualizations. An example would be, for the terminus element of tú·tk 'turkey', the representation C2a-C2b. In this representation, the occurring slot-class elements are connected by hyphen. Further examples are the post-nuclear clusters in myunú·ʔkstkp 'he is asking for mercy' represented as C2a-C2b-C2c-C2d, [11] and mcó·ʔmp 'are you going along?' represented as C2a-C2d. Explanation of the details of the application of the system will be presented in 1.32.

The feature mode of the phonotagmeme Onset I consists of an emic slot, the onset slot of Syllable-types I-IV, plus a filler class which may, in its simple form, be labelled C1. Onset I is distinctively identified by (1) its position preceding nucleus phonotagmemes in syllable structure, (2) the fact that it is an obligatory constituent of all the syllable-types of which it is a constituent, (3) its filler class C1, (4) its expandability. Characteristics 1,2, and 3 do not distinguish Onset I from Onset V. They are distinguished by a difference in expandability. There is only one expansion variant of Onset I, a sequence of Nasal or /s̜/ plus another consonant, and none for Onset V. Thus the overall expansion formula for Onset I may be expressed as Onset I = $\pm$ CN/s̜ + C1. The combination of Consonant plus /y/ is not considered a complex manifestation of a phonotagmeme, see above p. 39. Examples of simple fillers of Onset I are: m̲íc 'you', ny̲ʌ́hks̜ʌt 'he will go', ku̲hʉ́p 'hat', (pertinent forms are underlined). An example of a complex or expanded

[11] The sequence /-tk-/ functions as one unit, marked C2c, see pp. 73, 75.

variant of Onset I is mnãhksup 'you are going'. Onset V is characterized by only simple variants: Onset V = + C1.

The feature mode of the phonotagmeme Nucleus I consists of the nucleus slot of Syllable-types I-II plus a filler class which in its simple form may be labelled V. It is an obligatory constituent of Syllable-types I-II and follows Onset I in them. It is distinguished from other nucleus phonotagmemes by the syllable-types of which it is an emic constituent and by its expandability. In the case of nucleus phonotagmemes it is simpler to list the various variant forms than to express them in a formula. For Nucleus I the variants are V, V·, VʔV, V·ʔ, Vʔ, Vh, V·h, VʔVh. For Nucleus III the variants Vh, V·h, and VʔVh are not included in the expansion forms. For Nucleus IV there is only one variant V.

The feature mode of the phonotagmeme Terminus I consists of the optional terminus slot in Syllable-type I plus a filler class which in its simple form is labelled C2. It is distinguished from other terminus phonotagmemes by the syllable-types of which it is a constituent and by differences in expandability. The overall expansion formula for Terminus I is: Terminus I = + C2a $\pm$ C2b $\pm$ C2c $\pm$ C2d $\pm$ C2e (see p. 58). Terminus II consists of the optional terminus slot of Syllable-types II-III, of a filler class which in its simple form is C2a, and an expandability which may be represented as + C2a $\pm$ C2b. Terminus IV consists of the optional terminus slot of Syllable-types IV-V, of a filler class which is in its simple form C2a, and admits of no expansions.

1.22. The manifestation mode of phonotagmemes. The manifestation mode of phonotagmemes consists in every actualization of each phonotagmeme by any member of its filler class. Thus every occurrence of a phoneme as an onset,

nucleus, or terminus is a manifestation of a phonotagmeme. There is another sort of manifestation of a phonotagmemic unit, however. Phonotagmemes occur both as simple and as expanded forms. Terminus I, for example, has variants which contain as many as five consonantal slot-class positions. Each one of these variants, the various CC sequences comprising the variants of the phonotagmeme, is a manifestational variant of the phonotagmeme. Terminus I has variants which are C2a, C2a-C2b, C2a-C2c, C2a-C2d, etc. Since these will be listed in some detail under the emic classes of phonemes, they will not be described here.

1.23. The distribution mode of phonotagmemes. The distribution mode of phonotagmemes consists in their occurrences in structured sequences in larger phonotagmemic units, namely in syllable-types. Onset phonotagmemes occur as obligatory initial elements in all syllable-types; nucleus phonotagmemes occur as obligatory medial elements in all syllable-types; terminus phonotagmemes occur as optional terminal phonotagmemes in all syllable-types.

The distribution of individual phonotagmemes is as follows: Onset I is distributed as first member of Syllable-types I-IV; Onset V occurs as first member of Syllable-type V. Nucleus I occurs as the medial member of Syllable-types I-II; Nucleus III occurs as the medial member of Syllable-type III; Nucleus IV occurs as the medial member of Syllable-types IV-V. Terminus I occurs as optional final member of Syllable-type I; Terminus II occurs as the optional final member of Syllable-types II-III; Terminus IV occurs as the optional final member of Syllable-types IV-V.

1.24. Minimum units of structure. The units presented here as the lowest level units in the phonotagmemic hierarchy are not, strictly speaking, minimal units, inasmuch as they allow for expansion variants. The expansion variants of

phonotagmemes have slot-plus-class correlation structure.
It would thus seem reasonable to go to a lower level of pat-
tern and to determine the lowest level of phonotagmemic
structure to be a level of non-expandable units. Thus the
lowest-level of structure in the phonotagmemic hierarchy
would be that reflected in this study in the internal composi-
tion of the expanded variants of the phonotagmemes, the ex-
pansion alloclasses. These would be the phonotagmemes;
the units called phonotagmemes here would then be a higher
level of structure.

However, if such an additional level were postulated, it
would lead not only to one more level, but to a fairly large
number of different levels of structure. Specifically, be-
tween the level of syllable structure and that reflected in the
most expanded forms of the phonotagmeme elements, there
are several levels of patterned substitution. Looking at the
materials from a point of view of immediate constituents, the
syllable nucleus elements, for example, consist of a vowel,
to which may be added phonemic length, then to this possible
cluster may be added a further non-obligatory glottal element
(h or ʔ). There are thus three levels of pattern right within
the nucleus of the syllable. Between the levels of syllable-
structure and phonological-word-structure there are also
indications of more levels of patterned distribution than those
set up as basic levels of structure in our description. One
of these is the pattern of the sequence consonant-plus-y in
3.112. It does not seem that all of these levels are of equal
importance in the hierarchical structure.

The other reason for not considering all of these as
separate levels of structure is that it is not expected that
the strength of psycholinguistic response will be as heavy in
these areas as to the units posited here as linguistically
relevant units. This of course is a guess at this stage,
since no significant tests for psycholinguistic units have

62

been made. Our hypothesis, however, is that psycho-
linguistic testings will show significantly stronger responses
to certain clustering of phonemic units. Phonotagmemes are
posited as the emic constituents of syllable-types.

1.3. Emic classes of phonemes. As stated above in the
comparison of the description of classes between the Hockett-
like and Pikean treatments, there are two main emic classes
of phonemes in TM, consonants and vowels. In addition there
is a class consisting of one member, length of vowel, and an
emic sub-class consisting of /h/ and /ʔ/. Each emic class
consists of various alloclasses, each alloclass being a list
of phonemes occurring in a simple slot in syllable-structure,
or in an expansion-slot in syllable-structure. These allo-
classes comprise the filler components of phonotagmemes.
    Four subdivisions of these alloclasses are recognized
here. Simple alloclasses are the filler components of un-
expanded (simple) variants of phonotagmemes. Expansion
alloclasses are the filler components of the various expan-
sion variants of phonotagmemes. Sub-alloclasses are the
subdivisions of simple and expansion alloclasses according
to the expansion form of preceding and/or following phono-
tagmemes. Local sub-alloclasses are subdivisions of simple
and expansion alloclasses according to particular preceding
and/or following phonemes.

1.31. The emic class of vowel phonemes. Since the
distribution within the emic class of vowels is simpler than
that of the consonants, it will be presented first, as an
illustration of the classification.

1.311. Simple alloclasses of vowels. Simple alloclasses
of the vowel class of phonemes are filler classes of simple
variants of nucleus phonotagmemes. There are not as many
simple alloclasses as there are nucleus phonotagmemes since

63

some nucleus phonotagmemes have the same list of simple filler elements. If the classes of fillers of two nucleus slots are the same, they are considered to be the same alloclass. Simple alloclasses of vowels are the following:

1. Comprising filler classes of simple variants of the phonotagmeme, Nucleus I, an alloclass consisting of /i, e, æ, ɨ, ʌ, a, u, ʋ, o/. Illustrations: (Vowels manifesting Nucleus I are marked by stress ´.) tɨ́k 'lizard', kép 'tomorrow', ʔǽp 'shade', kɨ́p 'tree', mʌ́k 'strong', pák 'dove', ʔúc 'younger sibling', ʔúk 'dog', hók 'smoke', císk 'steam bath', cápc 'red', cúṣk 'green', kópk 'mountain', tʌm-díkʌc 'you've already changed', tʌʔʌcʌnʔéc 'I've already danced', mʔaécup 'you will dance', etc.

2. Comprising filler classes of simple variants of Nucleus III. The alloclass is the same as for Nucleus I, except that no example has been found for /ɨ/ in this class.

3. Comprising simple fillers of Nucleus IV, an alloclass consisting of /i, ʌ, a, u/. Illustrations: (Syllables containing the vowels in consideration are enclosed in parentheses.) ʔʌ́c(kin)nɨ́hks 'I would have gone', (tʌdʌ)púṣ 'he already cut it', (myak)ʔispʌ́hkp 'you are teaching', (ku)-ʔíṣpa 'visit', ʔʌ́ckinnʌ́hks(ni) 'I would have really gone', nvánʌ(kʌt) 'I will descend', sú·ṣ(pa) 'musician', mnʌ́hkṣ-(nup) 'you're really going'.

1.312. Expansion alloclasses of vowels. Expansion alloclasses of vowels are much simpler than those of consonants. Expansion variants of nuclei do not consist of sequences of different vowels, but rather consist of combinations of vowels with /ʔ, h, ·/. No nucleus contains diverse vowels; thus within any one expansion form of nucleus phonotagmemes, only one vowel class need be considered. Expansion alloclasses of vowels are:

1. In the nucleus expansions of the forms V·, VʔV, Vh,

64

V?, V·?, all vowels occur; there is an expansion alloclass whose membership is /i, e, æ, ɨ, ʌ, a, u, ʋ, o/.

2. In the nucleus expansion of the form V·h, there is an expansion alloclass whose membership is /i, ʌ, a, u, o/.

3. In the nucleus expansion of the form V?Vh, there is an expansion alloclass of the membership /ʌ, a, u, ʋ, o/.

Since Nucleus IV shows no expansion variants, and Nucleus III has no variants with /h/, these expansion alloclasses apply completely only to Nucleus I. All the following illustrations are of Nucleus I.

Illustrations of the expansion alloclass which is the filler component of expansion variants of the forms V·, V?V, Vh, V?, V·?, are:

/i/ pí·p 'grasshopper', cíʔiv 'squash', kɨ́hps 'level', píʔkhi 'small', pí·ʔt 'thread'.

/e/ mé·n 'money', néʔev 'wall', kéhk 'shoulder', méʔt 'hawk', ké·ʔc 'pulque' (a fermented beverage made from the century plant).

/æ/ kǽ·m 'pig', pǽʔæn 'nest', pǽhkṣ 'peach', cǽʔṣ 'corncrib', mǽ·ʔcpa 'thief'.

/ɨ/ mɨ́·n 'sweet potato', tɨ́ʔɨn 'excrement', tɨ́hkp 'inside the house', tʌtyɨ́ʔkṣ 'it already shone', ɨ́·ʔchɨ 'vomit'.

/ʌ/ ʔʌ́·c 'we', pʌ́ʔʌt 'cleaned', tʌ́hk 'house', mʌ́ʔk 'dew', ʔʌ́·ʔc 'louse'.

/a/ má·s 'baby', páʔam 'sickness', táhk 'walking stick', táʔkṣ 'drop (as of water)', ʔá·ʔc 'root'.

/u/ ṣú·m 'net', púʔu 'plank', púhk 'a plant (heliocarpus americanus)', ʔʌ̀ckinhúʔk 'I would have smoked', cú·ʔk 'tapir'.

/u/ pú·ca 'a certain type of tamale', pú?u 'sand', ?úhc 'foliage', tú?k 'one', cú·?k 'a kind of fruit'.

/o/ mó·k 'corn', pó?o 'moon', tóhks 'food', ka?ʌctí scó?y 'don't embarrass me!', pó·?p 'white'.

Illustrations of the expansion alloclass which is the filler component of expanded variants of Nucleus phonotag-memes having the form V·h are /i/ cí·hn 'candle'; /ʌ/ hʌ́·hn 'fire'; /a/ ?á·hy 'leaf'; /u/ tú·hk 'three'; /o/ só·hntkp 'he is happy'; /u/ nyú·hm 'he runs'.   The best contrastive evidence for the expansion variant V·h is that afforded by the form tú·hk 'three' (in contrast with táhk 'walking stick'). The other examples are all occurrences preceding nasals or /y/.

Illustrations of the expansion alloclass V?Vh are: pá?ahk 'sweet', pʌ́?ʌhntk 'soft like fur', cú?ʋhmk 'purple'.

1.313. <u>Sub-alloclasses of vowels</u>.   There are no vari-ants in the membership of simple or expansion alloclasses of vowels which depend on the expansion shape-type of preced-ing and/or following phonotagmemes.   That is, there does not seem to be any significant effect on the number of vowel contrasts exerted by the simple or expanded form of preced-ing or following elements.   The lack of restrictions of this sort should not be confused with the distribution of the ex-pansion variants of the nucleus phonotagmemes as such.   For instance, simple variants of Nucleus I do not occur in syl-lables without terminus preceding a phonemic-word bound-ary.   That is, "CV" syllables do not occur stressed in pho-nemic-word-final position.   Within the various occurrences of this simple variant, however, there is no effect on the list of occurring vowels depending on the expansion shape of preceding or following phonotagmemes.

1.314. <u>Local sub-alloclasses of vowels</u>.   For each

consonant of each simple or expansion alloclass of onset and
terminus phonotagmemes, a list of attested following or pre-
ceding vowels may be made. It would be further possible to
list sub-alloclasses according to certain combinations of
onset and terminus elements, or say to differentiate between
those vowels following particular onsets in syllables with
termini versus those without. Here only some of the more
salient characteristics of vowels preceding or following cer-
tain onsets or termini are considered. They are listed
negatively, that is, according to the particular vowels which
do not occur in certain environments. The actual sub-allo-
classes consist not of these negative lists, but of the total
simple or expansion alloclass which does occur, hence the
total class minus the items listed.

Following /y/ in manifestations of Nucleus I-III, /i,ɨ/
do not occur.

Following /s/, /ɨ/ does not occur.

Preceding /y/, /i,e,u/ do not occur.

Preceding /v/, /u/ does not occur.

The above restrictions apply within syllables, not in
cases where there is a syllable division between the vowels
and the following /y/ or /v/.

1.32. The emic class of consonant phonemes. The
Consonant emic class of phonemes will be considered in
terms of the same four alloclass groups as were employed in
the description of the Vowel emic class of phonemes: simple
alloclasses, expansion alloclasses, sub-alloclasses, and
local sub-alloclasses.

1.321. Simple alloclasses. Simple alloclasses of the
Consonant class of phonemes are simple filler components of
onset and terminus phonotagmemes. Here again, as in the
case of the vowels, there are as many simple alloclasses as
there are unexpanded slots in syllable structure. There

are, moreover, differences in alloclass membership, due not only to position of phonotagmemes relative to syllable structure, but also due to the position of syllable units relative to phonological-word structure.

Although for a complete description, each syllable-type should be considered separately with respect to its alloclass structure, the differences in simple alloclasses of consonants are not very great between different syllable-types. The description here is confined to the consonant alloclasses characteristic of the onset and terminus phonotagmemes of Syllable-type I, that is Onset I and Terminus I.

1.3211. <u>Simple onset alloclasses</u>. Phonemes occurring as simple manifestations of the Onset I phonotagmeme may be listed as follows:

/p, t, c, k, v, ş, m, n, y, ʔ, h, d, g, z̧, s/

However, this list actually represents two alloclasses. There is a difference between the list of phonemes which comprise simple manifestations of this onset phonotagmeme at the beginning of phonological-words and the list of phonemes which comprise simple manifestations in positions not phonological-word-initial. The alloclass of phonemes occurring as simple manifestations of the Onset I phonotagmeme in phonological-word-initial position consists of:

/p, t, c, k, v, ş, m, n, y, ʔ, h/

This is labelled C1a. The alloclass of phonemes occurring as simple manifestations of the Onset I phonotagmeme not in phonological-word-initial position consists of the longer list given previously, and is marked C1b.

Illustrations: pɨ́·p 'grasshopper', táhk 'cane', cé·v 'chicken', kaé·m 'pig', vá·şk 'sugar cane', sɨ́· 'tick', mék 'stone fence', nʌ́· 'water', yâ·v 'sweet corn', ʔé·ʔm 'cord', há·cy 'beast of burden'.

kupáhk 'skull', ʔatúʔc 'jaw', ʔápit 'thorn', ʔacóvʌ 'answer!', kucím 'bald-headed', mukúhk 'all right', kuváhk 'head', nʌsóya 'shirt', kumé·n 'rich man', ʔanú·ʔkṣ 'lent', ʔayó·va 'poor', ʔaʔús 'supper', ʔahóp 'breakfast', hadúʔk 'another', mugúʔuk ⁱrelative', masóʔokʌ 'let go!', vʌzóy 'embroidered'.

1.3212. Simple terminus alloclass. Phonemes occurring as simple manifestations of the Terminus I phonotagmeme comprise the following alloclass:

/p, t, c, k, v, ṣ, m, n, y/

This alloclass is labelled C2.

Illustrations: kép 'tomorrow', pí·ʔt 'thread', píc 'nixtamal', tík 'lizard', cív 'water jug', méṣ 'boy', cím 'load', ká·n 'salt', cáy 'scar'.

As in the case of the simple onset alloclasses, the description here is restricted to one terminus phonotagmeme, Terminus I. Simple alloclasses for other terminus phonotagmemes would be somewhat, but not markedly different.

There are two main differences in the membership of the principal onset and terminus alloclasses. One is that /ʔ/ and /h/ do not occur as members of the terminus alloclasses. This, even though syllables terminating in these sounds do occur. However, for reasons expressed in 1.33 these are treated as part of expanded nuclei. The second difference is the absence of /d,g,z,s/ in the simple terminus alloclass. This of course reflects the limited distribution of these phonemes (see 1.12).

1.322. Expansion alloclasses of consonants. Expansion alloclasses of consonants are lists of phonemes which occur in expansion slots of expanded variants of onset and terminus phonotagmemes. In this description, attention is again re-

stricted to the expansion alloclasses of Onset I and Terminus
I phonotagmemes.

1.3221. Expansion alloclasses of Onset I. Onset I has
two expansion variants. One of these is described by the
formula $\pm$ N + C1(N); the other by $\pm$ S + C1a. These two
variants are distinguished from each other in the constitution
of their classes and in the distribution of the total variants.
The expansion alloclass N consists of only /m, n/. The
alloclass C1(N) consists of /p, c, v, m, n, ?, h, d, g, z/. All of
the phonemes in this main expansion alloclass are either the
voiced member of a pair of phonemes with voicing versus
voicelessness as a significant contrast, or are voiced allo-
phones of phonemes. For instance, /mpáhk/ [mbáhk] 'your
bone'. The expansion alloclass S consists of only the pho-
neme /s/, and is followed by the alloclass C1a, that is
/p, t, c, k, v, s, m, n, y, ?, h/.

Illustrations of N- C1(N) are: mpáhk 'your bone', mcív
'your water jug', mví·hn 'your eye', mmáhtk 'your son',
mnÁ·s 'your daughter', m?ít 'your land', mhá·cy 'your
mule', mdá·k 'your mother', mgá· 'your cow', mzÁ· 'your
name', ncív 'my water jug', nví·hn 'my eye', nnÁ·s 'my
daughter', ndá·k 'my mother', ngá· 'my cow', nzÁ· 'my
name'.

These two variants differ not only in their composition,
but also in their distribution. Both have very restricted
occurrence. The expansion variants of Onset I involving
nasals in the first slot occur only in phonemic-word-initial
position. The expansion variants involving /s/ are further
limited in that they occur only at the beginning of phonemic-
words not in phonemic-phrase initial position. Occurrences
of this sequence are quite rare. An example is /?Ác skú·?p/
'he pricked me (as with a hypodermic needle)'.

Similar to these expansion variants but not treated as

70

expansion variants on the same level of structure are the sequences of consonant plus y. For reasons presented above in 1.114, these are treated as special close-knit units bordering on being single phonemes in syllable structure. Nonetheless, they do show a sort of slot-class structure, consisting of a slot filled by a class including all the members of Cla with the exception of /y/ itself, followed by a filler alloclass consisting of only /y/. Examples are of the sort of pyáhk 'his bone', nyɨhks̩ 'he went'.

There are also special distributional characteristics of syllable-initial slot-classes following syllables terminating in nasal phonemes. This will be discussed in 1.324.

1.3222. Expansion alloclasses of Terminus I. Expanded variants of the phonotagmeme Terminus I vary from two to six consonants. Such a small percentage of the possible sequences actually occur that it is convenient to list the actual combinations attested.

Clusters of two: /-tp, -cp, -kp, -s̩p, -mp, -yp; -kt, -vt, -s̩t, -nt, -yt; -pc, -kc, -nc, -yc; -pk, -tk, -ck, -kk, -s̩k, -mk, -nk; -ps̩, -ks̩; -tm, -cm, -sm/

Clusters of three: /-ks̩p, -kcp, -ps̩p, -tykp; -s̩tk, -ntk, -ntyk, -ks̩k, -ytk; -s̩km, -ks̩m; -ks̩t, -nct, -vct; -ypc/

Clusters of four: /-s̩tkp, -ntkp, -ks̩tk/

Cluster of five: /-ks̩tkp/

Cluster of six: /-ks̩tkpc/

One method of describing these sequences would be to treat each cluster length as a separate group. Expansion alloclasses would be the lists of items of like place in a series within each of these various groups. There would be by such a treatment two expansion alloclasses in clusters of two consonants, three different alloclasses in clusters of

three, etc. By such a description, the expansion alloclasses
for clusters of two would be:

    2a. /p, t, c, k, v, ṣ, m, n, y/

    2b. /p, t, c, k, ṣ, m/

Alloclasses for clusters of three would be:

    3a. /p, t, k, ṣ, n, y/

    3b. /t, c, k, ṣ/

    3c. /p, t, k, m/

Alloclasses for clusters of four would be:

    4a. /k, ṣ, n/

    4b. /t, k/

    4c. /t, k/

    4d. /p, k/

There is another manner in which to describe these
clusters of four that is more orderly and simple, however.
All of these clusters contain the sequence /tk/. Two of the
three examples contain final /p/, and two of them /ṣ/ pre-
ceding /tk/. The examples may be lined up so that these
items will be in the same alloclasses in all examples:

      ṣ   t   k   p

      n   t   k   p

  k   ṣ   t   k

In this treatment, /t, k, p/ each constitute sole members of
expansion alloclasses. Such an arrangement is also in
agreement with the sequence-order of the attested cluster of
five phonemes (kṣtkp) and with the cluster of six phonemes
(kṣtkpc). Thus, by the addition to the above five slots and
classes of a sixth slot-class correlation filled by /c/, all
the clusters of four or more consonants may be handled
within one class structure.

    This suggests the possibility of treating the whole sys-
tem of expanded termini in terms of one overall system of
expansion slots and expansion-alloclasses. One possible
such set of slots and classes is as follows:

C2a	C2b	C2c	C2d	C2e
p	-	tk	p	
t	-		t	
c	c		-	c
k	k		k	
v	-		-	
ṣ	ṣ		-	
m	-		m	
n	-		-	
y	-		-	

From this slot-class correlation it is possible to generate all the attested terminus expansions. However, by no means all forms generatable by this scheme have been attested. Some restrictions of the combinations within the model will be treated under sub-alloclasses and local sub-alloclasses.

There are doubtless other slot-class arrangements which would also generate the clusters in question. It is not insisted that this is the only possible interpretation of the data, nor that a better one could not be found. However, there are certain reasons for choosing this particular alignment. Some of these reasons are as follows:

1. This alignment of classes is easily correlated with the structure of unexpanded termini. The expansion alloclass C2a has the same membership as the simple alloclass which is the filler of the unexpanded variant of Terminus I. The other expansion alloclasses C2b-e are more restricted in membership.

2. Furthermore, this description is consistent with the

description of expansion variants of onset phonotagmemes, in that it allows for a distinction between main and peripheral slot-classes in the expansion variants. The expansion-slot structure of the Terminus I may be expressed by the formula + C2a ± C2b ± C2c ± C2d ± C2e. Every terminus expansion contains a member of C2a, plus one or more members of any of the other alloclasses. In this formula, C2a represents a main slot-plus-alloclass, while the remainder are peripheral to this. There does not seem to be any other evidence of hierarchical ordering within the expansion forms.

3. In clusters of two phonemes, all the members of C2a occur as first member of the cluster. Moreover, all but two of these, /v/ and /n/, occur with /p/ as the second member of the cluster. This is further evidence for treating them as one alloclass.

4. The determination of the last three slots and classes, C2c, C2d, C2e, depends on distributional evidence and on relationship to morphological structure. The following considerations are considered relevant:

a. The only element occurring as sixth consonant in a cluster is /c/. Moreover, in any cluster of more than two elements, /c/, when occurring, is always final. Furthermore, /c/ in this position is always a fused manifestation of a morpheme {ceʔe} 'emphatic particle'. It is on this sort of evidence that /c/ is made the sole member of an alloclass, C2e, in all occurrences beyond the second member of a cluster. Note however, that /c/ in cápc 'red' is a manifestation not of C2e, but of C2b.

b. The phoneme /p/ occurs as final element in clusters of all lengths except six consonants. In all these occurrences, /p/ constitutes a separate morph. It manifests one of two morphemes, a verb suffix {-p}, 'incomplete aspect', or a location suffix {-p}, 'inside of, specific location'.

74

Thus /p/ in all positions in termini except the first is considered a member of the alloclass C2d.

c. Final elements of clusters of three, four, five, and six elements, besides the elements just mentioned, include /t, k, m/. The /m/ in almost all cases manifests a morpheme in the same substitution class as the locational suffix {-p}, namely {-m} 'inside, general location'. The phonemes /t/ and /k/ both manifest nominalizing elements, not very active in present-day word formation. (/k/ in clusters of three or more consonants may also be a part of the sequence /tk/ manifesting the form {tʌk} and occurring as C2c.) Since /m/ is of the same grammatical class as the /p/ considered above, since the /t/ and /k/ are also morphemically additive elements mutually exclusive with the foregoing /p/ and /m/ and with each other, and since these four phonemes--together with /c/--constitute the final elements of all clusters of three or more consonants in length, they are considered as one alloclass, C2d.

d. All clusters of more than three consonants contain the sequence /tk/. This is a manifestation of a derivational element {tʌk}. This is considered as a single unit for purposes of expansion structure, since the elements always occur together. The /k/ of this group is not in the same expansion class as the previously mentioned /k/ of class C2d.

5. The remaining cluster elements can be described in terms of one more slot-class correlation, that represented by expansion alloclass C2b. The clusters consisting of phonemes of expansion alloclasses C2a and C2b are monomorphemic. Those containing members of other alloclasses are polymorphemic.

An objection at this point might be that the interpretation is overly influenced by considerations which have to do with morphological structure as much or more than with phonological structure. This may seem the more strange, since

one tenet of this approach is the distinctness between morphological and phonological units. To this there are two answers. One is that the alloclass structure chosen is one of several possibilities. The decision has been to use divisions into alloclasses which show as much correlation to morphological structure as possible. The other answer is, that although the evidence is strong to show that there is a difference at almost every, if not every, level of structure between phonological and morphological units, (see 0.71) this does not mean that there are not interdependencies between them. Especially in the area of distribution of alloclasses of phoneme classes, there are pronounced correlations between grammatical categories and restrictions in phonemes occurring in particular slots and expansion slots. While wishing to avoid decisions as to causality, it seems to this investigator that to maintain that morphological structure is not significant to phonological structure is to ignore evidence.

Furthermore, although morphophonemic evidence is utilized for the establishment of the alloclasses, it should be possible to use the posited class structure and the terminus expansion formula both to describe occurring expanded termini, and also to generate all expanded termini, by use of the model and without reference to morphophonemic evidence.

There are limits on the inclusion of elements with special morphemic significance in the classes. The basic structure of the terminus phonotagmeme is considered of primary importance. Every expanded variant of Terminus I contains at least an element of Class C2a. Thus a final /p/, if the only element in the terminus manifestation, is a member, not of C2d, but of C2a, regardless of its morphemic status. Likewise, /c/ is considered as a member of C2e only if final element in clusters of three or more consonant phonemes.

76

One other rule in application of the alloclass structure to actual clusters is that if there are two possible assignments of a cluster in terms of its members, the one which assigns the consonants to the lower-ordered slots is considered preferable. Thus tú·tk 'turkey' manifests slots a and b, not slot c or slots a and d.

1.323. Sub-alloclasses of consonants. Sub-alloclasses of consonants are a further subdivision of simple and expansion alloclasses, subdivided according to the expansion state of preceding and/or following phonotagmemes. In TM phonological structure, only one instance of a significant difference in class membership due to such influence has been noticed. This is the distributional fact that preceding nuclei of the expansion form V?V, the phoneme /?/ does not occur.

There are, however, considerable restrictions in the occurrence of expansion alloclasses of terminus phonotagmemes, depending on the particular combinations of expansion alloclasses manifested. The list of phonemes manifesting the alloclass C2a is considerably different in expansion variant combinations of the shape-types C2a-C2d than in the combinations C2a-C2b-C2c-C2d, or even than in the form C2a-C2b.

1.324. Local sub-alloclasses of consonants. At an even finer level of differentiation, simple alloclasses, expansion alloclasses, and even sub-alloclasses can be further subdivided in terms of what particular phonemes may or may not occur contiguous to what other phonemes. A complete description of class structure down to and including this level would constitute an exhaustive description of distributional structure. Such a description would state all the restrictions of occurrences not covered in the expansion formula for Terminus I, for instance. The level of sub-alloclass structure is not included in this description.

77

The description of phoneme classes will serve as a complete guide for the generation of clusters only if the structure down to and including local sub-alloclasses is included. That is, limitations of distribution dependent on particular phoneme environments must be included to prevent the generation by the model of sequences which do not actually occur.

1.33. Emic sub-class of phonemes. Besides the classes of consonants and vowels, there is an emic sub-class consisting of the phonemes /ʔ,h/. This class is determined from the occurrence of these phonemes in positions within syllable nuclei, Vʔ, V·ʔ, Vh, V·h, VʔV, VʔVh. It is treated as a sub-class because its membership is made up entirely of units from another class of phonemes, consonants. It is set aside as a special emic group because its function in syllable structure is quite different from other slot-filling classes. All the alloclasses of consonants are simple or expansion alloclasses of onset and terminus phonotagmemes. Simple fillers of these phonotagmemes are always consonants. The emic sub-class on the other hand occurs in positions whose simple fillers are vowels. This distinct distribution is considered a sufficient criterion for setting this up as a special sort of phoneme class. In this interpretation, /ʔ,h/ are members of the emic sub-class. They are also members of the class of consonants.

Reasons for considering the combinations of vowel and this emic sub-class as complex nuclei rather than as parts of following terminus or onset elements are phonetic, distributional, and morphophonemic.

Phonetically, as explained in 1.12, the sequence VʔV is actualized as laryngealization of part of the vocoid span. There is no sharp break in phonation. This occurrence of the phoneme /ʔ/ is distinct from its occurrence syllable-

78

initially, where it is a quite perceptible glottal stop or catch.
Also in the expansion V·? the glottal element is phonetically
laryngealization of part of the vocoid span. Thus, in the
case of V?V at least, there is good phonetic evidence for
treating the /?/ as being within the syllable, and even within
the nucleus, especially since it contrasts with V·? in the
relative portion of the vocoid span in which laryngealization
is centered. The phonetic similarity between V· and V?V
also supports their treatment in a similar manner.

The distributional evidence is that there seems little
dependence between the glottal elements /h/ and /?/ and
the following phonemes or clusters, whereas within termini,
as shown in the description of classes above, there is a
great deal of restriction in the combinations which occur.

The morphophonemic evidence stems from the fact that
there is a large number of morphemes which show alternation
between various of the nucleus expansions posited here.
There are verbs in which the stem form alternates between a
form with V and one with Vh, or between V? and V?V, or
between V· and V?V; examples are: {paéhtp ?ác yám} 'I am
going up', and {tʌ ?ác mpét} 'I already went up', {myak-
pí?cp} 'you are extinguishing it' and {tʌ ṣyakpí?ic} 'you
already extinguished it', {paé·tp ?ác yám} 'I am sweeping'
and {tʌ?ác npé?et} 'I already swept'. Treatment of all
these alternations as parts of syllable nuclei makes for more
uniformity between phonological and morphemic structure.

It may further be mentioned that treatment of glottal
elements as part of nuclear structure is not uncommon,
expecially in American Indian languages.

1.4. Morphophonemics. As mentioned above in 1.13,
phonemes have a significant distribution both in syllables,
units of the phonemic hierarchy, and also in morphemes,
units of the morphemic or lexical hierarchy. The distribution

79

of phonemes in the area of lexicon or morpheme structure is here labelled <u>morphophonemics</u>. A detailed description of the phonemic shapes of morphemes is not included in this description. However, certain resemblances and differences between the distribution of phonemes in syllables and in morphemes will be pointed out.

One difference is that a morpheme may contain more than one syllable; sequences like CVCVC (pícʌm 'to go out'), CVCVʔVC (masóʔok 'to let go') are to be described under the distribution of phonemes in morphemes. Also morphemes are sometimes less than one syllable in length. There is a considerable variety of such forms, including the prefixed person markers {n-} '1st person', {m-} '2nd person', as possessives, also the form {y-} '3rd person', whose morphophonemic characteristics include its metathesis with stem-initial consonants. Also included would be forms like {-ʌn} 'instrumental suffix'. This form always adds a syllable to the form to which it is affixed, (as in paé·tʌn 'broom'), but does not in itself constitute a syllable.

Thus, in a catalogue of morpheme shape types, there would be morpheme elements consisting of single syllables, elements consisting of less than one syllable, and elements consisting of more than one syllable. There would be greater diversity of phonemic pattern of morphemes than of syllables.

Although these two matrices for phoneme distribution are considered as structurally distinct, this does not mean that they are therefore completely independent of each other. There are very definite interdependencies. Some morphemes, by their phonemic shape, never constitute syllables. Others, however, (free morphemes) must exhibit the phoneme patterns of permitted syllable or syllable sequence patterns. All TM root morphemes exhibit sequence patterns represented in syllable-structure. This does not mean that every occurrence of a root constitutes a syllable or syllable-

sequence, however. A syllable may be composed of root plus affixes.

A further correlation is to be seen in the morphemic constituency of certain syllable patterns. All syllables with more than two terminus elements are morphemically complex. Moreover, the morphophonemic structure of these complex termini is used as a source of evidence for the phonemic interpretations of the clusters (see above 1.3221).

1.5. Marginal phonemes and co-existent phonemic systems. There are certain phonemes in TM, which, although they contrast with other phonemes, do not occupy any significant position in the hierarchical structure of the phonological system, nor even in the system of contrastive units. These are labelled "marginal" phonemes and not included in the main body of this description. Some such sounds are:

řʹ (a prolonged trill, more prominent than the trill of Spanish). This occurs in only one word, řeʔtʌk 'woodpecker'. It is of onomatopoetic origin.

r and l, from Spanish loan words. In many Mixe dialects, early borrowings from Spanish contain numerous l and r sounds, but are otherwise assimilated to Mixe sound structure. In the Totontepec dialect of the language, such early loans are noticeably absent. Forms with l and r are almost not evidenced, except in one area, in which they are very common. This is the area of common names, rather specifically in shortened forms of Spanish names. Examples are láfa 'Raphael', mélo 'Carmelo', tríni 'Trinidad'.

As in every bilingual situation, one problem faced here is that of the interpretation of the influence of the incoming language on the structure of the phonemic system of the indigenous language. Many TM speakers are reasonably fluent handlers of Spanish of the variety spoken by the non-Indian-speaking population of that part of Mexico. Most speakers

of TM speak some Spanish. Moreover, the Spanish spoken by these bilinguals, at least that of the present generation of young adults, is not markedly affected in its phonological aspects by their native language.

Now, the speech of these bilinguals in their own language contains recent loan words from Spanish, taken from the active Spanish vocabulary of these speakers. The actual percentage of such words varies considerably from speaker to speaker, as well as from situation to situation. The percentage of Spanish loans used in speaking Mixe is not necessarily in proportion to the ability of the person to speak Spanish. Some of the most proficient bilinguals use a relatively low percentage of Spanish loans in their Mixe conversation.

One approach to the speech of such a group would be to consider the Spanish and native forms as combining to form one overall system. The point of view followed here, however, is to treat these as essentially different and separate systems. In this the theoretical point of view expressed by Fries and Pike in "Coexistent Phonemic Systems" is followed. [12] To handle the whole corpus in one analysis would not mean merely the addition of a few more phonemic contrasts; rather it would involve an intricate readjustment of the entire phonemic and phonotagmemic structure. For the two phonemic systems differ, not only in the number of contrasts but also in the contrastive relationships and in the phonetic substance of the allophones. For instance, Spanish vowels not only have a different number of contrasts from TM phonemes, but the allophones are enough different that a correlation to one system would be a complicated task, if possible at all. Also the distributional structure of the loans is considerably different from that of the native TM

[12] Charles C. Fries and Kenneth L. Pike, "Coexistent Phonemic Systems," Language, 25.29-50, (1949).

forms. To introduce these complexities into the description of syllable structure would add considerable complexity to the total system. It is my opinion that the speakers of TM maintain the two language systems essentially separate in their speech of their language.

Again, this does not mean that there is no effect of Spanish in TM phonology. The above treatment applies easily only to recent borrowings or reborrowings from Spanish, essentially unassimilated to the sound structure of TM. There are probably forms in TM which are of Spanish origin, but have been completely assimilated to Mixe patterns of sound structure. These forms are not distinguished from native Mixe words. There are also intermediate forms, although the Totontepec variety of Mixe is notably free from these. One example however is a TM form ʔóhala, which is a special pre-verb element meaning 'look out' or 'be careful'. This is very similar to the Spanish form ojalá! 'may it be!'. The differences between these two forms, though not extensive, are considerably more than would be implied in the transcriptions. First the vowels are phonetically different. Spanish /o/ is much higher than TM /o/, approaching TM /ʊ/. Spanish /a/ is much farther front than TM /a/, approaching TM /æ/. In Spanish the first consonant is [x], in TM [h]. The Mixe approximating form does not fit native pattern completely, however, since it contains also the sound 1. This has been included above as a special marginal phoneme, but not given any serious consideration as a functioning unit in phoneme class structure. Some speakers also pronounce both forms according to Spanish norms.

2

Syllables and Syllable-Types

TM phonemes combine to form syllables, the second level in the phonemic hierarchy. Likewise, TM phonotag-memes combine to form syllable-types, the second level of the phonotagmemic hierarchy. The units of these hierarchies are described in this chapter according to their feature, manifestation, and distribution modes.

Every phonotagmemic unit consists of a slot-plus-class correlation. Thus a syllable-type consists of a slot (which is a relevant position in the structure of a phonological-word-type), and a filler class (which is basically an alloclass of syllables). This composition will be further described in 2.21.

This use of syllable-type should not be confused with the consideration of syllable-type by many as a "CV shape-type". The definition of syllable-type in this study of TM phonology allows for variation in CV shape-type within a given syllable-type. The most basic criterion involved in the definition of a syllable-type is its relationship to a next higher level of phonotagmemic structure. Syllable-types are emic constituents of phonological-word-types. Syllable-type I (which is defined as the center of a phonological-word-

type) has sub-emic variants which are of several CV shapes, from CV to CV·?CCCCCC; the criteria for considering these as the same syllable-type depend on characteristics of distribution in the larger phonological units, along with certain phonetic characteristics of the manifesting syllables. Syllable-type V also has sub-emic variants of the shapes CV and CVC. Thus one emic TM syllable-type includes more than one CV shape-type, and some CV shape-types are characteristic of more than one syllable-type. All TM syllable-types have variants of the shape-types CV and CVC.

The same sort of relationship pertains between syllable-types and syllables as between phonotagmemes and phonemes. In the same manner in which phonemes are determined by their contrastive occurrences as members of filler classes of phonotagmemes, emic syllables constitute the filler classes of syllable-types. Syllable-types, likewise, are manifested by syllables.

2.1. Syllables. 2.11. The feature mode of syllables. The feature mode of TM syllables consists in identificational-contrastive features which distinguish each syllable from every other syllable and which distinguish syllables as a level of emic structure from other levels. Syllables are distinguished from other levels of structure in terms of their phonetic base in articulation, and in terms of the position which they occupy in the phonemic hierarchy, intermediate between phonemes and phonemic-words. Different syllables are distinguished from each other by the phonemes which comprise them. There are two main sources of information relevant to the identification of syllables. One is the phonetic base. The other source is in distributional relationships of phonemes occurring in structured sequences to form syllables, and syllables in structured sequences to form phonemic-words. In these distributional characteristics,

the syllables concerned are manifestations of syllable-types, and the phonemes which in sequence comprise syllables are manifestations of phonotagmemes.

2.111. The phonetic base and segmentation of syllables. An articulatory base, a phonetic syllable, provides a basic unit of segmentation for emic syllable structure analogous to that provided for emic structure on the phoneme level by the phonetic segment. In Language, Pike posits this segmentation principle in terms of a chest pulse. In doing this, he follows Stetson, though not without reservation (Pike Language 9.221). Another approach to the phonetic basis of syllables would be in terms of acoustic characteristics. For this study, neither of these methods of physical measurements have been utilized. It is taken as an assumption that there is an articulatory base for syllable structure; however, no measurements of chest pulses have been made for TM syllables. Rather, the phonetic basis employed has been that of an impressionistic articulatory transcription of the sort in common use in field studies. The adequacy of such recording depends upon the training, experience, and skill of the linguist, and also upon the utilization of an adequate method of analysis.

There are some characteristics of considerable importance to the treatment of phoneme-length segments which also have similar applicability to syllable segmentation. These serve to reinforce the sort of phonetic approach made here. One of these characteristics is that there is not complete agreement between segments defined by phonetic criteria and segments defined relative to a phonemic system. For instance TM /c/ consists of a phonetic sequence [ts]. Also some phoneme sequences may be phonetically simple; TM /hy/ is most often manifested as [Y]. Likewise, assuming an adequate phonetic basis for syllable division, it is to be

expected that some phonemic syllables may be equal in length to more than one or less than one phonetically defined syllable segment.

A second important characteristic of the relationship between phonetic and phonemic segments is that, although not all phonemes are of one phonetic segment length, a great majority of them are. Moreover, there are certain types of phonetic segments which show considerable tendency towards variation in relationship to a phonemic segmentation and other phonetic segments which may be considered for all practical purposes as equal to single phonemic segments. This characteristic permits the procedural classification employed by Pike in which segments are classified into "non-suspect" and "suspect" groups, relative to their relationship to phonemic segmentation.[1] There is of course no well-defined boundary between elements which are suspect and non-suspect, but rather a large number of degrees of suspectivity. One further factor of relevance with respect to this characteristic is that this classification of phonetic segments reflects an acquaintance with phonetic and phonemic segmentation in a large number of languages. It is an etic classificatory system of the sort mentioned in 0.33.

Detailed information of this sort for a similar classification of phonetic syllables is not available. Moreover, a detailed classification of phonetic syllables according to the tendency to pattern as parts of complex phonemic syllables (or as the manifestation of two phonemic syllables) presupposes a fairly well-defined phonetic syllable as a starting point (though, see comments below regarding phonetic segments). In spite of these two limitations, however, it is possible to make some use of Pike's procedural tool and treat certain types of phonetic sequences as more suspect

[1]K. L. Pike Phonemics p. 131.

for syllable segmentation than others. Some of the relatively suspect areas in TM syllables are functions of vowels and glottal components ([ʔ], [h], laryngealization, and breathiness), occurrences of a nasal plus another consonant at the beginning of a phonemic-word, also the occurrence of nasals following another post-vocalic consonant or consonants, the occurrence of clusters of stops in noticeably open transition.

A third useful characteristic (and perhaps the most crucial in terms of analytical procedure) of phonetic segments is that the phonemic segmentation is determined by the application of distributional criteria. The suspect data are treated in a manner which gives a maximum congruence to a total system based on the patterns of non-suspect data. Problematical areas for syllable segmentation are likewise considered in the light of relatively non-suspect syllable patterns. (Note that the maximum congruence sought is not to the non-suspect data as such, but to a total system including all data, suspect and non-suspect.)

The use of distributional evidence has the following special significances:

1. It may allow the same phonemicization from two phonetic notations which differ in the number of segments transcribed. The phonemic sequence /hy/ could be derived from elements tentatively identified phonetically as [Y], [Yy], [hy], or as a particular configuration of resonance characteristics represented on sound spectrograms. An adequate analytical method would allow for the same analysis (or analyses) regardless of which of these phonetic symbols was employed as a first approximation to the phonemes involved. (The use of distributional evidence may also permit more than one phonemic interpretation from the same phonetic base.) The phonetic base is relevant, but there may be multiple means of describing its phonetic characteristics.

88

These need not agree--however, they need to be ultimately interconvertible.

2. Because of the fact that most if not all problematical areas are determined by distributional evidence, knowledge of the detailed phonetic characteristics may not be crucial to making an adequate phonemic interpretation of syllable sequences. It is necessary, however, that phonetic descriptions be sufficiently accurate and detailed to identify phonemic contrast. In this description of TM phonology, although there is considerable room for refinement in the identification of phonetic syllables, very definite and systematic distributional characteristics provide a high degree of confirmation of the description of syllables. Another corroboration is found in the integration of the postulated syllables into a total hierarchical structure of the phonemic and phonotagmemic units.

The preceding paragraphs have assumed that the phonetic segment is a clearly defined and delimited physical unit. This assumption, though an extremely useful one in phonemic analysis, is not without its problems. For even though there is very little disagreement among field workers in the interpretation of speech sequences in terms of phonetic segments or "phones", it is a considerable problem to define these phonetic segments accurately. This difficulty arises from the fact that segmentation into phones is a discretization which shows no direct reflection of the relatively continuous nature of the acoustic evidence. Speech is produced by complex movements of a number of different articulators whose movements are not always (if indeed in any significant percentage of cases) simultaneous. Pike's definition of phonetic segments identifies them in terms of

89

centers rather than of boundaries.[2] This is to some extent the problem in the definition of phonetic syllables. In some cases it is relatively easy to establish two syllable peaks, as in American English 'Betty', but difficult to establish the boundary between syllables.

The interpretation of phonemic syllables in terms of distributional evidence does not mean that phonetic evidence is not relevant to such units. This should be readily observable in the distributional evidence itself. The suspect sequences are interpreted in terms of patterns, but these patterns are based on the phonetic evidence of relatively non-suspect syllables.

There are, furthermore, certain phonetic data which constitute evidence of contrast in syllable structure. In TM, there is a phonetic difference between allophones of /ʔ/ occurring intervocalically within syllables, and intervocalic allophones constituting the onset of new syllables (1.12). The sequence VyʔV is phonetically different depending upon whether the syllable-division precedes or follows /y/. Examples: haé ʔævè ʔe yʔîht 'he was' (syllable division before y), nayʔamá ʔtp 'downfallen' (syllable division after y). The sequence VNʔV (N = nasal) also shows contrastive syllable-boundary placement in a similar manner. This evidence is of primary importance in the interpretation of syllable-structure. Phonemic interpretation is not possible without distributional evidence; however, interpretation must be based also on all available phonetic evidence of articulatory base and of contrast.

Segmentation into phonemic syllables is in TM relatively simple. All syllables have onsets. These, as noted above, consist of a simple consonant, of the special sequence

[2] Kenneth L. Pike, Phonetics; A Critical Analysis of Phonetic Theory and a Technic for the Practical Description of Sounds, Ann Arbor, Michigan: University of Michigan Press, 1943, p. 107.

90

consonant-plus-y, or, in limited environments, of a nasal plus another consonant or ş plus another consonant. The fact that these latter complex onsets occur only at the beginning of phonemic-words allows for a very simple segmentation principle. <u>Within</u> <u>phonemic-word</u> <u>units</u> <u>the</u> <u>boundary</u> <u>of</u> <u>a</u> <u>phonemic</u> <u>syllable</u> <u>occurs</u> <u>preceding</u> <u>a</u> <u>consonant</u> <u>which</u> <u>precedes</u> <u>a</u> <u>vowel,</u> <u>or,</u> <u>if</u> <u>a</u> <u>vowel</u> <u>is</u> <u>preceded</u> <u>by</u> <u>consonant-</u> <u>plus-y,</u> <u>the</u> <u>syllable-boundary</u> <u>precedes</u> <u>this</u> <u>sequence.</u>[3] This "rule" describes syllable-boundaries within phonemic-words. At boundaries of phonemic-words, certain contrastive patterns occur which do not occur within phonemic-words. Some of these were listed in the preceding paragraph.

Problematical areas in TM syllable segmentation are: sequences of the type VʔV, voiceless stops in open transition, nasals following certain types of nucleus expansion variants or other consonantal elements, and certain sequences of nasal or /ş/ preceding another consonant in turn preceding a vowel element. TM syllables are posited of all these shapes, from evidence as follows:

1. Complex nuclei of the form VʔV. Evidence for treating VʔV as the nucleus of a single syllable consists in the following: (a) Its phonetic nature. It does not constitute a new pulse of energy nor a sharp interruption of the breath stream, but rather a laryngealization of a portion of the vocoid span in syllable structure. (b) Its position in patterned contrasts. The phoneme /ʔ/ has markedly different allophones in this environment from those it has when occurring syllable initially (1.12). (c) Its relationship to other forms of syllable-nuclei. Not only are complex nuclei of the form VʔV posited, but also others of the forms V·, Vʔ, V·ʔ, Vh, V·h, VʔVh (1.34).

2. Voiceless stops in open transition. There is direct

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[3] A qualification to this statement will be made in 3.112.

contrastive evidence that there are patterns of sequences of
stops terminating syllables. To a form like tǔ·tk 'turkey'
may be contrasted tótʌk 'butterfly'; to cápc 'red' may be
contrasted tʌ́pʌc 'badger'. Even the extremely long form
myunǔ·ʔkstkp 'he is asking for mercy' may be contrastively
compared to myunǔ·ʔkstʌkʌt 'he will ask for mercy'.

3. For the treatment of the problematical post-nuclear
nasal elements, the evidence is not quite so clear. Evidence
for contrasts of the sort mentioned for the stop sequences
are lacking. However, in some environments, the sequences
concerned seem fairly definitely to have the phonetic charac-
teristics shown by sequences of syllables, and in other
environments phonetic characteristics paralleling those of
single syllables. Thus the forms pícʌm 'to come out' and
ʔí·cʌm 'wild boar' are interpreted as bisyllabic, being
similar in syllabification to tótʌk 'butterfly' and ʔí·ʔcʌc
'rainbow'. On the other hand, pá̇ʔtm 'place name', kʌ́hsm
'above', kʌ́·ʔsm 'shrimp' have syllabic and timing charac-
teristics more like those of single syllables. The phoneme
/m/ in these environments, as in kóhm 'on a hill' is voice-
less or only very lightly voiced, noticeably different from
[m] in pícʌm 'to come out'. The phoneme /n/ in similar
monosyllabic forms is illustrated in té·ʔn 'ladder', hǔʔn
'like'. Bisyllabic sequences with /n/ are of the form of
pǽ·tʌn 'broom'.

4. Prenuclear elements consisting of a nasal plus an-
other consonant or of /s/ plus another consonant at the
beginning of a phonemic-word are also interpreted as be-
longing to single syllable units. The alternatives in this
area would be either to treat the nasal or /s/ element as
pertaining to a previous syllable, or to treat the nasal or
sibilant phoneme as a syllable in itself. Since they are not
preceded by a vocoid, and all other syllables do include
vocoid quality, it seems better not to set up syllables with-

out vowels. Thus the structure of syllable onsets is made more complex (but only in certain environments); however, the syllable structure posited still conforms to the general pattern of an onset, a nucleus, and an optional terminus.

2.112. Phonemic composition of syllables. Another main characteristic of the feature mode of syllables is their composition in terms of phonemes. Each syllable is distinguished from every other syllable in terms of the phonemes of which it is composed. Part of the feature mode of the TM syllable /ti/ is that it is composed of a sequence of the phonemes /t/ and /i/. It is distinct from other syllables /pi, sa, pa?am/.

A complete description of the feature mode of TM syllables includes a catalogue or list of the various syllables occurring in a sample of reasonable size. However, the number of examples to be given in connection with the description of the syllable-type and the description of the emic classes of syllables are considered sufficiently representative to make a more exhaustive list not economic for present purposes.

2.113. Meaning in the feature mode of TM syllables. As pointed out in the introduction, tests for TM syllables as response units have not as yet been set up; there are, however, certain other indications of the meaning component of the feature mode of syllables. One of these is that the occupation of a significant place in a hierarchy of units does itself to an extent constitute an evidence of meaning. However, another evidence of meaning may be found in certain unelicited responses reflecting a native reaction to syllables as units. The outstanding example of this in my experience comes from the behavior of one informant who, to facilitate transcription of long words (whose unstressed syllables tend to be quite rapidly pronounced) would repeat these words

93

syllable-by-syllable, with no apparent regard for mor-
phemic boundaries.

2.12. The manifestation mode of syllables. The mani-
festation mode of any syllable includes all its actualized
sub-emic variants. In the same sense as was true concern-
ing phonemes, there are as many variants of a syllable as
there are occurrences of it. Also, these variants may be
grouped into distributional variants, similarly though not so
facilely as in the case of phonemes. The syllable /ti/ may
have one variant as a manifestation of Syllable-type I, an-
other as a manifestation of Syllable-type II, etc. Such
variants of syllables relative to their occurrences as mani-
festations of different syllable-types are of course related
to their positions relative to the phonemic-words in which
they occur.

Syllables may also have variants under stylistic con-
ditioning factors. Breathy or laryngealized quality of
stretches of speech--beyond the phonemic qualities asso-
ciated with the phonemes /ʔ/ and /h/--is characteristic of
certain stylistic variations of TM speech. Breathy quality
is used to show excitement and emphasis. One sort of
laryngealization is characteristic of apologies and suppli-
cations. These voice qualities affect the manifestations of
the syllables. Also, syllables have manifested variants
according to the particular pitch on which the syllable is
pronounced, and the manifestation mode of syllables is
therefore related to the intonational system. Also differ-
ences in rate of speech affect the manifestations of syllables.
Both of these last two factors have close association with
rhythmical factors.

Inasmuch as any syllable is determined by its emic con-
stituents (as part of its feature mode), it will manifest vari-
ants only within the allophonic range of its constituent pho-

94

nemes. By definition, different phoneme sequences constitute different syllables. However, this criterion of syllable identification is not always easy to apply. For example, manifestations of the morphemic sequence {nʌ́hksp ʔʌ́c yám} 'I'm going now' may vary from the syllabification reflected in the above transcription to nʌ́hkspcyàm, in which the morpheme {ʔʌ́c} is marked only by one phoneme /c/. Between these two extremes there are, among other variants, some of the form nʌ́hksp̣ʔʌcyàm. The syllable /ʔʌ/ in such forms tends to be very unstressed and rapid in pronunciation. In many occurrences it is difficult to decide whether or not it should be considered as having occurred.

2.13. <u>The distribution mode of syllables</u>. The distribution mode of a syllable consists of its distribution (actual and potential) in larger phonemic units, namely in phonemic-words. In this distribution, the syllable is part of structurally relevant sequences of syllables, in the same respect as phonemes distributed in syllables are arranged in relevant sequences. Also as in the case of phonemes, syllables are members of filler classes of syllables which comprise filler components of syllable-types.

Generalizing from the structure of phonemes, phonotag-memes, and emic classes of phonemes, a similar treatment of syllables, syllable-types, and emic classes of syllables is to be expected. There does not seem to be any structuring on the level of syllable-structure, however, to parallel the composition of emic classes of phonemes. (Another way of stating this may be that there is only one emic class of syllables in TM.) No basic clear-cut phonetic and distributional distinction like that found for consonants and vowels is evidenced. There are different syllable-types, and the classes of fillers of these various types are distinct. However, these distinctions are not of a sort which could be

called central to the distinctive characteristics of the syl-
lables. Every syllable contains an onset and a nucleus, and
there are syllables with a terminus and syllables without a
terminus manifesting all syllable-types. Moreover, the
membership of the various filler classes is very similar; the
membership of the classes which are relatively restricted in
membership is contained in the membership of the less re-
stricted classes. Therefore, although the relevant distri-
bution of syllables is related to their function as manifesta-
tions of syllable-types, there is no effort made here to
group the filler classes of different slots in phonological
word structure into an emic class structure of syllables.

There is a major difference between the treatment of the
distribution mode of units in Pike's presentation and the in-
terpretative application of it made here. Although a more
detailed discussion of this will be given in Chapter 6, a short
discussion of it is relevant here. Pike includes as part of
the distribution mode of units--rather technically as part of
the distribution mode of classes of units--the internal tag-
memic constituency of those units. This aspect of distribu-
tion is not included in this presentation as part of the distri-
bution mode; it is related rather to the definition of the
feature mode of a phonotagmemic unit. To be specific, the
internal slot-class-structure exhibited by filler classes of
syllables is part of the feature mode of the syllable-type,
namely its emic constituency. This consideration did not
enter at the level of the phoneme, since phonemes are not
composed of smaller units.

2.2. Syllable-types. 2.21. The feature mode of
syllable-types. There are two levels of phonotagmemic
structure in syllable-types. Also there are two main com-
ponents at each of these levels. The two levels are (1) the
syllable-types themselves as phonotagmemic units, and (2)

96

the emic constituency of the syllable-types. The two com-
ponents at each of these levels are (a) an emic slot or posi-
tion in phonological structure, and (b) a filler class of pho-
nemic units which comprises the filler of that slot. The slot
component of a syllable-type per se is a significant position
in phonological-word-type structure; the filler class is the
class of syllables whose members occur as manifestations of
the phonotagmemic unit, the syllable-type. An example is
the "Central-stressed-syllable-type", or Syllable-type I,
consisting of the central slot of phonological-word-type
structure and the class of full-stressed syllables which
comprises the filler of that slot. The emic constituents of
any syllable-type are phonotagmemes. (The slots of these
phonotagmemes are positions in syllable-type structure and
their filler classes are alloclasses of emic classes of
phonemes.)

At present five syllable-types are postulated for TM.
Their number is tentative, due largely to the as yet insuffi-
ciently described phonetic characteristics of syllables and
phonemic-words, most importantly the lack of a satisfactory
treatment of stress. The five postulated syllable-types may
be described, according to their relevance in phonological-
word-type structure, as (1) Central-stressed-syllable-type,
Syllable-type I, (2) Pre-central-stressed-compounding-
syllable-type, Syllable-type II, (3) Pre-central-reduced-
stress-syllable-type, Syllable-type III, (4) Pre-central-
unstressed-syllable-type, Syllable-type IV, (5) Post-
central-unstressed-syllable-type, Syllable-type V. These
are usually referred to by their numbers, as "Syllable-type
I", etc.

Illustrations of these syllable-types are as follows:
Syllable-type I is manifested in monosyllabic phonemic-
words by: mų́hkp 'it's shrinking', kų́ʔu 'squirrel', vá·s
'fox'. In polysyllabic phonemic-words it is manifested by:

97

kutáé·ʔtʌn 'chicken's comb', tʌdʌpatíʔic 'he already pushed him', ngá·ʔyumup 'we'll eat'. Syllables manifesting Syllable-type I are stressed (ˊ).

Syllable-type II: syllables manifesting Syllable-type II are also marked with loud stress (ˊ), and occur preceding the center syllable (Syllable-type I), within a phonemic-word. A manifestation of Syllable-type II does not necessarily occur contiguous to the center syllables, however. The following are illustrations of Syllable-type II: cíʔks-pí·hntk 'firefly', káhpʌngʌ́hsm 'in town', ʔúhcvíspa 'pulling weeds'.

Syllables manifesting Syllable-type III are marked by reduced stress (ˋ). Illustrations of this type are: kàecʔám 'at the mountain', càptʌ́hk 'church'.

Syllables manifesting Syllable-type IV are unmarked as to stress characteristics and can be identified in the following examples by this characteristic plus their occurrence preceding the syllables which are marked for stress. Illustrations of Syllable-type IV are: kuʔíspa '(a) visit', tʌdʌyakʔìspʌ́k 'he already taught him', ʔaváʔt 'below'.

Syllables manifesting Syllable-type V are unmarked as to stress characteristics and may be identified in the following illustrations by this characteristic plus their occurrence following syllables which are marked for stress. Illustrations of Syllable-type V are: púhsʌn 'iron', vìtʌpúhpa 'washing clothes', nyʌ́hkstinuvat 'they are really going also'.

As phonotagmemic units per se, these syllable-types represent five different emic constituents of phonological-word-types. The slot components of these emic constituents of phonological-word-types are: (1) for Syllable-type I, a Central-stressed-syllable-slot, (2) for Syllable-type II, a Pre-central-stressed-compounding-syllable-slot, (3) for Syllable-type III, a Pre-central-reduced-stress-syllable-

slot, (4) for Syllable-type IV, a Pre-central-unstressed-syllable-slot, and (5) for Syllable-type V, a Post-central-unstressed-syllable-slot. The filler class components of these syllable-types are the lists of syllables which individually manifest the syllable-types. For instance, the filler class of Syllable-type I is comprised of all the different syllables which occur as central stressed syllables of phonemic-words.

The various syllable-types also show differences in emic constituency. These differences in emic constituency, however, do not show in the simple phonotagmemic structure of the syllable-types, but in differences in expandability of the various phonotagmemes of these syllable-types. For example, Terminus I, a constituent of Syllable-type I, has a considerably greater expandability than Terminus IV, a constituent of Syllable-type IV (see 1.21). The general phonotagmemic constituency of all syllable-types is described in one general formula:

+ Onset   + Nucleus $\pm$ Terminus

The terms of this formula, however, do not describe phonotagmemes, but rather groups of phonotagmemes. By specifying particular phonotagmemes the various syllable-types are distinguished.

Syllable-type I is represented by the formula:
+ Onset I   + Nucleus I $\pm$ Terminus I
Syllable-type II is represented by the formula:
+ Onset I   + Nucleus I $\pm$ Terminus II
Syllable-type III is represented by the formula:
+ Onset I   + Nucleus III $\pm$ Terminus II
Syllable-type IV is represented by the formula:
+ Onset I   + Nucleus IV $\pm$ Terminus IV
Syllable-type V is represented by the formula:
+ Onset V   + Nucleus IV $\pm$ Terminus IV

99

The differences in expandability of the syllable-types are the differences in expandability of the constituent phonotagmemes. These have been described in 1.2, and need not be reiterated here, except to point out that the expandability of a syllable-type includes the combined expandability of all its constituent phonotagmemes.

The definition of syllable-type employed here is another illustration of the application of the hierarchical slot-plus-class approach to language structure. The characteristics of syllable-structure which relate to the patterned occurrence of syllables as members of classes of syllables and manifesting slot-class units, are considered of more basic importance in determining the major structural characteristics than is the internal composition of the syllables.

At the expense of redundancy, it should be pointed out, however, that differences in expandability, which distinguish between syllable-types, are differences in the CV shape type variation of the filler classes of these syllable-types, and in this sense these formal variants are related to the feature mode of syllable-types.

2.22. The manifestation mode of syllable-types. There are two areas of relevance in the manifestation mode of syllable-types. One is that every occurring syllable is a manifestation of some syllable-type. The number of manifestations of this sort is equal to the number of different TM syllables. However, it is more profitable to speak of manifested variants in another sense. This is the characteristic described above, that the expansion of the phonotagmemic constituents of syllable-types results in a variety of different formal variants, that is different "CV shapes". The slot-plus-class structure of these syllable-type variants may be described according to the expansions of their constituent phonotagmemes. In this system, /tîk/ 'lizard',

/pák/ 'dove', /sím/ 'there' are examples of the Syllable-
type I variant C1a-V-C2a. /tǔ·tk/ 'turkey', /vá·ṣk/ 'sugar
cane' are examples of the variant C1a-V·-C2a-C2b, and
/nǔ·?kṣtkpc/ in /myunǔ·?kṣtkpc hǽ?æ/ 'he is asking par-
don' is an example of a manifestation of a variant C1a-V·?-
C2a-C2b-C2c-C2d-C2e. [4]

Further illustrations of formal CV variants of Syllable-
type I are:

1. With simple nucleus form:

C1a-V	péhi 'slender'
CN-C1(N)-V	mpíhʌn 'your book-bag'
C1a-V-C2a	vʌ̂k 'wasp'
CN-C1(N)-V-C2a	n?ʌ̂m 'my uncle'
C1a-V-C2a-C2b	císk 'steam bath'
CN-C1(N)-V-C2a-C2b	mcísk 'your steam bath'
C1a-V-C2a-C2b-C2d	tíkcp 'it is changing' (it changes)

2. With nucleus of the form V·:

C1a-V·	cǎ· 'stone'
C1a-V·-C2a	pí·p 'grasshopper'
C1a-V·-C2a-C2b	vá·ṣk 'sugar cane'

3. With nucleus of the form V?V:

C1a-V?V	kǔ?u 'squirrel'
C1a-V?V-C2a	pá?am 'disease'
C1a-V?V-C2a-C2c	kí?iṣtk 'viscous'

4. With nucleus of the form V?:

C1a-V?	té? 'mister'
C1a-V?-C2a	tǔ?k 'one'

[4] Note that "C2c" represents the phoneme sequence /-tk-/ (1.3222).

C1a–V?–C2a–C2d	pí?cp 'it's going out (a light or flame)'
C1a–V?–C2a–C2b–C2d	pá?ksp 'he's march- ing'
C1a–V?–C2a–C2b–C2c–C2d	vyinmí?kstkp 'he is blinking'

5. With nucleus of the form V· ?:

C1a–V· ?	té· ? 'father'
C1a–V· ?–C2a	sʌ́· ?k 'fingernail'
C1a–V· ?–C2a–C2b–C2d	pó· ?ksp 'he's rest- ing'
C1a–V· ?–C2a–C2b–C2c	kʌnmunú· ?kstk 'I would have asked forgiveness'
C1a–V· ?–C2a–C2b–C2c–C2d	myunú· ?kstkp 'he is asking forgiveness'

6. With nucleus of the expansion form Vh:

C1a–Vh	póh 'wind'
C1a–Vh–C2a	páhk 'bone'
C1a–Vh–C2a–C2b	maéhck 'two'
C1a–Vh–C2a–C2b–C2d	vʌ́hskm 'day after tomorrow'

7. With nucleus of the expansion form V·h:

C1a–V·h–C2a	tú·hk 'three'
C1a–V·h–C2a–C2b	ví·hnk 'strange'
CN–C1(N)–V·h–C2a–C2c–C2d	mví·hntkp 'you are kneeling'

8. With nucleus of the expansion form V?Vh:

C1a–V?Vh–C2a	pá?ahk 'sweet'
C1a–V?Vh–C2a–C2b	cú?uhmk 'purple'

This list of expansion variants is not complete.

The possible patterns unattested in these lists raise the question of the significance of such absences. The terminus variant C2a-C2b-C2c-C2d occurs following V·? but not following Vh, for instance. Are these systematic, structurally-significant gaps or are they of a sporadic nature and therefore might reasonably be expected to occur in a larger sample? To this question no answer is given here; there are some factors bearing on it, however, which may be pointed out.

One of these is that there is a definite restriction in attestations of larger clusters of terminus elements for some nucleus shapes. In the evidence examined thus far, for the nucleus types V, V·, and V?V, there are no examples with termini exceeding three consonants.

On the other hand, the paucity of examples of large clusters of any shape preclude any considerable variation in nucleus shape-types attested preceding such clusters. There is only one cluster attested with five consonants. Further, it is not expected that many similar clusters will be discovered.

Morphophonemic considerations again enter the picture here. Most complex termini are to be found in verb structure. For example, /tk/, a reduced allomorph of {tʌk}, a component of all clusters of more than three elements, is a derivational suffix.

There are certain patterns of distribution of nucleus expansion which are also related to these clusters and to morphophonemic structure. A verb like písṭʌk 'to blow, (as with bellows)' has two basic stem forms, one in which the morpheme {tʌk} occurs as a separate syllable, /písṭʌk/ the other in which it occurs as part of a complex terminus, /mpí·ṣtkp/. There are no examples of verb stem forms with short vowel and complex termini of the shape /-tkp/. This

103

sort of relationship holds for almost all verb root classes, although not all verbs contain the /tk/ complex. There are syllable-final clusters ending in /-p/ for all verbs, but not all nucleus-shape-types occur preceding this suffix. Verbs with short vowels in some forms, have a stem allomorph whose nucleus shape is V· or Vh, depending upon class membership, in this environment. Similarly, verbs with nucleus of forms V?V in some forms have stem allomorphs whose nucleus form is V· or V? in this environment, the difference again reflecting a classification of verb stems. Only verbs whose nucleus form is V·? and certain bisyllabic roots (though the interpretation of some of these is open to question) occur without allomorphic variations in nucleus shape in all inflected forms. This may account for the relative availability of examples for this nucleus shape-type.[5]

Some formal variants of syllable-types do have significantly restricted distribution. Some examples of this are:

1. The shape-type variant "CV" of Syllable-type I does not occur in phonological-word-final position.

2. Shape-type variants of Syllable-types I-IV with initial "CC" are limited in occurrence to phonemic-word-initial positions.

3. Shape-type variants of Syllable-type I with six consonants in the terminus occur only phonemic-word final preceding a quite restricted set of morphemic forms. Syllable-type I variants of five consonants also are limited to phonemic-word-final position.

The picture for the remaining syllable-types, though not as complex as in the case of Syllable-type I, is generally similar.

[5] This statement is in need of modification according to a more recent and detailed study of verb stem-classes by Alvin Schoenhals: "A Grammatical Classification of Totontepec Mixe Verbs," University of Texas Masters Thesis, June 1962 (unpublished).

2.23. The distribution mode of syllable-types. The distribution mode of syllable-types is comprised of their occurrences in larger phonotagmemic units, namely in phonological-word-types.

Since all phonological-word-types have the same internal structure (3.2), the distribution of syllable-types is quite restricted, any one syllable-type being restricted to one significant distribution in phonological-word-type structure. However, phonemic-words may contain more than one manifestation of one syllable-type, as illustrated for Syllable-types IV-V by tʌdʌyak?ĭspɫk 'he already taught him', nyʌ́hkstinuvat 'they also will go'.

The distribution of syllable-types is also relevant to the feature mode of phonological-word-types, since a major formal component of the feature mode of a phonological-word-type is its emic constituency of syllable-types. Thus, further detail concerning distribution of syllable-types may be derived from 3.11.

3

Phonemic–Words and Phonological–Word–Types

Phonemic–words, units of the third level in the TM phonemic hierarchy, are composed of one or more syllables. Monosyllabic phonemic–words are /cúʔuhmk/ 'purple', /yʌ́k/ 'black'; a polysyllabic phonemic–word is /ʔàksnàsʌsúˑsʌn/ 'mouth organ' (more literally 'cross–wise wind instrument'). Phonological–word–types, units of the third level in the TM phonotagmemic hierarchy, are composed of one obligatory central syllable–type (Syllable–type I) and four other non–obligatory syllable–types. The monosyllabic phonemic–word given above manifests the minimum variant of a phonological–word–type; this variant consists of only a central syllable–type (Syllable–type I). The polysyllabic word cited manifests a complex variant of a phonological–word–type; this variant consists of a non–obligatory Syllable–type III (having two occurrences in this example––ʔàks and nà), a non–obligatory Syllable–type V (sʌ), an obligatory Syllable–type I (súˑ), and a non–obligatory Syllable–type V (sʌn). In a notation similar to that used in describing phonotagmeme variants,

this can be described as St III- St III- StV- St I- StV. (St I ab-
breviates "Syllable- type I".)

Phonemic- words and phonological- word- types, besides
having this emic constituency of lower- level units, are also
themselves emic constituents of larger emic units. Pho-
nemic- words are emic constituents of phonemic- phrases;
phonological- word- types are emic constituents of phono-
logical- phrase- types. From this point of view, a phono-
logical- word- type consists of a significant slot in phono-
logical- phrase- type structure plus a class of filler items,
which are phonemic- words.

3.1. Phonemic- words. Phonemic- words, as elements
in the phonemic hierarchy, are thus very closely related to
and dependent upon phonotagmemic units. Each phonemic-
word manifests a phonological- word- type. Also, in a
manner similar to that in which phonemes are determined in
terms of lists of substitution items which occur in struc-
turally relevant positions in syllable- type structure, so
phonemic- words are determined in terms of lists of substi-
tution items occurring in three significantly different posi-
tions (slots) in phonological- phrase- type structure.

3.11. The feature mode of phonemic- words. The
feature mode of phonemic- words, as of all emic units,
consists in identificational- contrastive features. These
features distinguish phonemic- words from all other levels of
linguistic structure and also distinguish different phonemic-
words from each other. The identificational aspect of this
feature mode refers to the phonetic characteristics of
phonemic- words. The contrastive aspect refers to their
meaningful characteristics. "Meaningful" in this application
signifies that phonemic- words constitute one level in a
hierarchy of linguistic units, and that the postulated units
are (theoretically) testable response- units of behavior.

Features relevant to the phonemic-words are of the following sorts: (1) stress characteristics, (2) boundary-marking characteristics, (3) timing characteristics, (4) emic constituency in terms of syllables. Evidence of all four of these sorts enters into the differentiation of phonemic-words as a level of structure. Stress characteristics and emic constituency distinguish one phonemic-word from another.

3.111. Stress as a feature of phonemic-words. Stress was not included as a phoneme in Chapter 1. However, it has phoneme-like properties in that it is of significance in distinguishing morpheme shapes. There is in TM a pair of forms /ʔápit/ 'thorn' and /ʔapít/ 'rolled up', which differ only by stress placement. Further evidence of contrastive value of stress is shown by the fact that placement of the full-stress syllable which is the center of the phonemic-word is not predictable relative to phonemic-word boundaries. Thus the center syllable in a phonemic-word (the manifestation of Syllable-type I) may be the first syllable in the phonemic-word, as in cyó·ʔndinuva 'they also left'; it may be the last syllable, as in ʔʌ̀cʌnguhúp 'my hat'; it may occur medially, as in kutǽ·ʔtʌn 'rooster comb'.

The functional load of stress in the phonological system is quite light. The pair of examples given above constitutes the only minimal contrast discovered to date. Also, there is a further restriction in contrastiveness relative to mor-phemic structure. With the exception of forms in which certain stressed verbal suffixes occur, the full-stressed syllable, in any TM morphemic-word also constituting a phonemic-word, is the root syllable, or in the case of poly-syllabic roots, the first syllable of the root. The form /ʔápit/ is a polysyllabic root; /ʔapít/ consists of a prefix {ʔa-} plus a root {pít}. The root of /cyó·ʔndinuva/ is {có·ʔn}, of /kutǽ·ʔtʌn/ is {-tǽ·ʔt}.

There are three stressed verbal suffixes. They are: {váʔan}, with an allomorph /vá·n/, 'desiderative', {kóh} 'again', and {kắhṣ} 'completely'. These are not mutually exclusive; more than one of them may occur in a single form. In forms containing these suffixes, the syllable manifesting Syllable-type I is the last such syllable in the form. Preceding syllables of this group and the root syllable in such forms tend to have full-stress and are considered as manifestations of Syllable-type II. Illustrations are:

/mnʌ́hkṣuvá·mp/ 'you want to go'

/kaʔʌcʌnnʌ́hkṣuváʔany/ 'I don't want to go'

/mnʌ́hkṣkóhɨvá·ndinup/ 'you (pl.) want to go again'

/mnʌ́hkṣkʌ́ṣkóhɨvá·ndinup/ 'all of you want to go again'

Nevertheless, (in spite of the fact that not many morphemes are distinguished in terms of stress characteristics alone), stress plays an important part as a distinguishing characteristic of phonological-word-structure. Each distinctive constituent of this level of structure has its own stress characteristics. That is, there are many different patterns of stress and unstress in the composition of TM phonemic-words. A few illustrations of this variety are given here; a more complete list is presented in 3.22. Illustrations:

1. a single-full-stress syllable   /mcó·ʔmp/ 'you're going along'

2. unstress-stress   /kuhúp/ 'hat'

3. stress-unstress   /píhʌn/ 'book-bag'

4. unstress-stress-unstress   /ʔamá·ṣʌn/ 'Spanish language'

Phonological structure is presented in this study as a hierarchical arrangement, in which units of one level are composed of units of a next lower level of structure. Phonemic-phrases are composed of phonemic-words, which in turn are composed of syllables, which are composed of phonemes. The use of the term "phoneme" is thus restricted to units which are significant constituents of syllables. The treatment made here of stress, as a significant or emic constituent on the phonemic-word level, does not fit this definition.

Stress is thus not a phoneme; nor is it a syllable, phonemic-word, or phonemic-phrase. It is here treated as constituting a special accentual system--an accentual system with zero to use Hockett's terminology.[1] This system includes, at the phonemic-word level, three stress units or characteristics--full, reduced, and non-stress, each of which is a characteristic of a certain syllable-type or types and is distributed significantly in phonological-word-structure.[2]

It is important to note that stress is not on the same level of structure in TM as other phonetic characteristics which often pattern as "suprasegmentals" in languages. Length of vowel in TM is considered as a phoneme. (It is not quite the same as other phonemes--vowels and consonants--since it does not have articulatory-change characteristics of other phonemes, and occurs only as part of an expanded nucleus.) As a constituent of syllable-nuclei, however, it patterns in closer connection to the consonants and vowels than to stress and pitch characteristics in TM phonology. Stress constitutes an accentual system which

[1] Manual of Phonology, p. 65.

[2] This accentual system also includes two other significant stress levels relevant at the level of phonemic-phrases. These will be discussed in 4.11.

110

patterns on the level of phonological-word-structure. Pitch characteristics form an <u>intonation</u> <u>system</u> which patterns on the level of phonological-phrase structure (4.3).

Every phonemic-word contains at least one syllable with full stress, marked (ˊ), manifesting the central syllable-type—Syllable-type I—of a phonological-word-type. Phonemic-words may also contain other full-stressed syllables manifesting Syllable-type II, other reduced-stress syllables marked (ˋ) manifesting Syllable-type III, and other non-stressed syllables, unmarked, manifesting Syllable-types IV-V.

Each phonemic-word contains only one manifestation of Syllable-type I. However, there may be more than one occurrence of the other constituent elements and therefore of stressed syllables. An example of a phonemic-word with four full-stress syllables, of which only the last one manifests Syllable-type I, is /nʌ́hkskʌ́skóh̷ɨvá·ndinup/ 'they all want to go again'. The other three full-stress syllables manifest Syllable-type II. The above cited /ʔàksnàsʌsú·sʌn/ 'mouth organ' contains two manifestations of Syllable-type III. An example of a form with more than one occurrence of Syllable-type IV is /haʔʌcmicʌnyakʔó·ʔkʌt/ 'and I will kill you', of more than one occurrence of Syllable-type V is /mnʌ́hksnuvap/ 'you are going also'.

3.112. <u>Boundary-marking characteristics of phonemic-words</u>. Certain sequences occur at boundaries of phonemic-words which do not occur within them.

1. Complex onsets of syllables, consisting of a nasal plus another consonant or of /s̩/ plus another consonant, occur only at the beginning of phonemic-words. In /mdá·k/ 'your mother', the sequence /md/ constitutes a complex onset. In /mìcʌmdá·k/ 'your mother (you emphasized)', there

is a syllable division between these two sounds, as they occur within a single phonemic-word.

2. Related to this is the limitation of the occurrence of the sequence nasal plus voiceless consonant (or voiceless allophone of certain phonemes [i.e. /p/, /c/] for which voicing is not a significant feature) to situations involving a phonemic-word boundary. Thus the sequence /nt/ occurs only when the nasal terminates one phonemic-word and the stop initiates another. Examples of this are /pʌ́n tí/ 'whatever' and /sím pá?tm/ 'over there in "pá?tm" (place name)'.

3. Certain complex termini are limited in occurrence relative to the boundaries of phonemic-words. Syllables terminating in /c/ as a manifestation of C2e occur only at the boundaries of phonemic-words. Moreover, a phonemic-word thus terminated is never the last in a phonemic-phrase. The form /myunú· ?kstkpc haé?æ/ 'he is asking pardon' is a typical example of this terminus component.

Other complex termini, those containing a manifestation of C2d, tend to occur at phonemic-word boundaries. This is due to the fact that these occur only at boundaries of mor-phemic-words, and that morphemic and phonemic boundaries tend to coincide. However, this is not a factor determinative of phonemic-word boundary, since, for example, the sequence of morphemic-words {nʌ́hksp} {?ʌ́c} {yʌ́m} 'I am going now', occurs commonly either as one or two phonemic-words: /nʌ́hksp ?ʌcyʌ́m/ or /nʌ́hksp?ʌcyʌ̀m/, or even /nʌ́hkspcyam/.

4. In the statement given above in 2.111 concerning the predictability of syllable boundaries within phonemic-words, sequences of the sort consonant-plus-y were considered as always constituting simple distributional units. This statement is not completely accurate, however. A form like {yakyónʌ} 'make it longer' usually occurs as one phonemic-word with syllable division between /k/ and /y/. That is,

consonant-plus-y does not pattern as a single distributional unit in this example. There are a few examples like this which show contrast within a phonemic-word between sequences V.CyV and VC.yV (the lowered dot indicates syllable division). Thus {yak-yónʌ} 'make it longer'.

This contrastive syllable-boundary placement does not occur at all positions within phonemic-words. It is restricted to the beginning of a full-stressed syllable. Actually, most attested forms occur following two particular pre-central unstressed syllables manifesting the morphemes {yak-} 'causative' and {tuk-} 'derivative prefix difficult to gloss'. Since there is only a small number of forms exhibiting this contrast, they are distinguished by means of a hyphen separating sequences of consonant-plus-y with intervening syllable boundary within phonemic-words.

According to the framework of our general approach, these junctural data constitute evidence for another level of distributional structure. That is, this is evidence for another layering of phonological pattern in TM between syllables and phonemic-words. While not denying the evidence and unable to prove conclusively that such an intermediate level of phonemic structure does not have major structural importance in the phonological system, it is not posited as another major level of structure for reasons of the sort presented in 1.2. Also, this would be a level with little to distinguish it in terms of phonetic characteristics from the level of phonemic-words. It does not seem that the amount of functional importance reflected here merits an entire layer of phonological structure for its description, although it merits further consideration.

3.113. Timing characteristics, as features of phonemic-words. In the phonetic transcriptions on which the analysis presented here is based, there are some characteristics of

113

the phonemic-words which seem to be best described as
timing or rhythm features. However, these timing charac-
teristics are not very prominent, and by no means of the
order of magnitude of timing characteristics associated with
the markings of phrase structure, nor of hesitation or stutter
forms. However, phonemic-words are heard as groupings
of syllables or single close-knit stress-rhythm groups. In
some cases, this sort of evidence has been used to determine
boundaries of phonemic-words. In the interpretation of
sequences of syllables with full stress in which there are no
definitive boundary-marking characteristics on which to
base a decision as to the number of phonemic-words or their
boundaries, this type of evidence is used with reservation.
The sequence of full-stressed syllables in /nʌ́hkskʌ́skóhɨ-
vá·ndinup/ 'they all want to go again', is pronounced more
rapidly and at a more steady level of intensity or tenseness
than a sequence of monosyllabic phonemic-words, as /kép
ʔʌ́c nnʌ́hksʌt/ 'I will go tomorrow'. However this interpre-
tation must be regarded at best as being in need of thorough
and methodical acoustic analysis of the duration charac-
teristics. Preliminary steps toward such a treatment have
been begun, but significant results are not available.

3.114. The emic constituency of phonemic-words. Pho-
nemic-words are composed of from one syllable, as in /ʔʌ́c/
'I', to a quite large number of syllables. It is difficult to
draw an upper limit to the size of phonemic-words. They
are at least as large as the largest occurring morphemic-
words; an example of a fairly long morphemic-word taken
from story text is /nyanyastʌ́ʔyiʔukvá·hni/ 'he began to
lower himself'. Also, phonemic-words often contain more
than one morphemic-word. One example, /hæcʔʌcmicʌn-
yakʔó·ʔkʌt/ 'and I will kill you', according to its content in
morphemic-words, is {hæc} 'and', {ʔʌ́c} 'I', {míc} 'you',

114

{nyak?ó· ?kʌt} 'I will kill'. There are instances in which
each of the morphemic-words in this example constitutes an
entire phonemic-word, with the exception of {hæc}, which
does not comprise a phonemic-word in itself, except as a
citation form, and even then it is not easily elicited.

In the same sense as a syllable is distinguished from all
other syllables by the phonemes comprising it, a phonemic-
word is contrastively identified by the syllables comprising
it (plus its stress pattern). Thus the phonemic-word /tɨhps/
'rope' is identified by the syllable /tɨhps/ of which it is
composed. It is a different phonemic-word from /tʌ́?ksp/ 'it
shines', which is composed of a different syllable. The
syllables /tɨhps/ and /tʌ́?ksp/ are both manifestations of
the same syllable-type, however, Syllable-type I. They
also are distinguished as phonemic-words from /tʌdʌpa-
nɨhks/ 'he already followed him' by virtue of the fact that
they are composed of different syllables. All three, occur-
ring as complete phonemic-phrases, are manifestations of
the same phonological-word-type, the Head-phonological-
word-type (3.2).

3.115. Indeterminacy in phonemic-word boundaries. In
some instances, boundaries of phonemic-words are contras-
tively identified by boundary-marking characteristics. For
instance, a sequence of a nasal as terminus plus a voiceless
phoneme as following onset includes a phonemic-word
boundary between these phonemes, as in the example /pʌ́n
pʌ́n/ 'whoever'. Also, in some cases, timing characteristics
signal phonemic-word boundaries quite clearly. However,
in other cases, neither of these factors is perceptible as a
distinguishing criterion for phonemic-word boundary. In
such cases, the actual point of division between phonemic-
words is often indeterminate.

The extent of this indeterminacy on a practical level is

increased by the lack of dependability of the evidence from timing characteristics. As stated above, the timing characteristics of phonemic-words are not easily noted. Moreover, the interpretation of evidence of this sort is subject to considerable interference from knowledge of morphemic boundaries. The investigator may think that he is reacting to a phonological boundary when actually his response is strongly conditioned by knowledge of morphemic boundaries. More accurate phonetic description should provide for a more thorough treatment of timing factors. Until this is provided however, the only very definite characteristics for the identification of phonemic-word boundaries are the characteristics given above in 3.112 as boundary marking characteristics, and timing factors when most obvious.

A situation of this sort, in which it is possible to identify centers of units--in this case phonemic-words--but not to identify exactly the boundaries between units, is labelled by Pike as a "border in double function" (Pike Language 9.32).

Such phenomena are not restricted to the level of phonemic-words. Pike also allows for syllable margins in double function, as does Hockett, who gives them the name of "interludes".[3] There are no interludes in TM syllable structure on an emic level. The reason for this is that all TM syllable sequences can be segmented without ambiguity. Almost every syllable has one and only one consonant as onset, giving a regular rule for the syllable segmentation on a phonemic basis. The few syllables with complex onsets are distinguishable from the others by audible phonetic characteristics. Otherwise stated, all TM syllables exhibit a structure consisting of an obligatory onset, an obligatory nucleus, and a non-obligatory terminus. In English, on the

[3] Manual of Phonology, p. 52.

116

other hand, the much greater variety in shape-types of syllables does not allow for any such distributional definition of syllable segmentation; thus situations occur in which it is not possible to decide, either phonetically or phonemically, where the point of syllable division is to be drawn. Such a form is English 'butter', for instance.

However, at the level of TM phonological structure under consideration here--that of phonemic-words--the situation is considerably different. The only obligatory constituent of a phonemic-word is a central syllable. Phonemic-words may also contain pre-central and post-central elements. Post-central syllables are usually unstressed and may occasionally include syllables with reduced stress. Pre-central syllables are unstressed (manifesting Syllable-type IV), reduced-stressed (manifesting Syllable-type III), or full-stressed (manifesting Syllable-type II). Furthermore, there may be more than one of most of these constituents in one phonemic-word.

Thus, on the basis of distributional evidence of the sort used to segment emic syllables in TM, it is not possible to segment sequences of stressed and unstressed syllables unambiguously into phonemic-words. This may be illustrated by considering an arbitrary sequence of stressed and unstressed syllables. Representing such a sequence by --´--´--´- in which the hyphens represent TM unstressed syllables and the acute accents represent TM full-stressed syllables, this can be divided into several arrangements of phonemic-word groupings. (This example could be further complicated by adding syllables of reduced stress or by specifying the shape-type variants of the syllable-types represented. However, the example is sufficient for present purposes.) Some possible segmentations of this syllable-sequence are:

117

--´ ´-- ´- /hæchæmés nyʌ́hksnuva tékum/ 'and
the boy went on foot'

--´ ´ --´- /hæchæmés ʔóhc tʌyakpícʌm/ 'and
the boy went to take (it) out'

--´´ --´- /hæchæcíʔkspí·hntk tʌyakpíʔcni/'and
he extinguished the firefly'

--´´-- ´- /hæcʌnyʌ́hkskóhnuva tékum/ 'and he
also went again on foot'

Others could be added.

3.12. The manifestation mode of phonemic-words. The
manifestation mode of phonemic-words consists in the
various occurrences of such units. Its characteristics are
parallel to those described for other phonemic units. Vari-
ants of a phonemic-word are as numerous as the occurrences
of that phonemic-word, since no two actualizations are
exactly the same. On the other hand, there is a patterned
variation in the actualized variants. In the manifestation
mode of phonemic-words, as in that of syllables, the major
variants have to do with different positions in the structure
of larger emic units, and with the occurrence in different
speech styles and with different rates of utterance.

The principal difference in environment which influences
the manifested variants of phonemic-words is their position
in the composition of phonemic-phrases. A phonemic-word
occurring as the head of a phonemic-phrase has certain
characteristics of extra length, loudness, and contrastive
pitch characteristics. Phonemic-words which occur at the
end of phonemic-phrases also have certain terminal charac-
teristics not characteristic of other phonemic-words. The
phonetic characteristics of such variants will be discussed
in connection with phonemic-phrases and intonational
structure.

Also, as in the case of other phonemic units, manifestational variants are limited to differences which do not constitute different phoneme sequences. For a difference in constituent phonemes constitutes also a difference in constituent syllables and therefore in phonemic-words. /nʌ́hksp?ʌcyàm/ and /nʌ́hkspcyam/ both glossed as 'I am going now', both constituting single phonemic-words, are not the same phonemic-word.

The same sort of problem concerning thresholds exists for phonemic-word variants as for other units in the phonemic hierarchy. There are many sequences of syllables for which it is difficult to judge whether there are two phonemic-words involved or one. There is also the problem of deciding whether two given sequences are the same or not, with respect to syllable constituency.

The sequence of morphemic-words {nʌ́hksp ?ʌ́c yám} 'I am going now', in a large number of occurrences may have some occurrences in which the sequence manifests as three phonemic-words, as /nʌ́hksp ?ʌ́c yám/. There would be a fairly large number of occurrences of the form /nʌ́hksp ?ʌcyám/, and others of forms /nʌ́hksp?ʌcyàm/ or /nʌ́hkspcyam/, etc. The interpretation of threshold between such manifestations is difficult. In the present state of phonetic description, it involves subjective interpretation of varying degrees of stress, of minute timing characteristics, as well as the general characteristics of the "segmental phonemes". The problem of syllable constituents of phonemic-words is exactly that which applied on the level of syllables considered in themselves, and consists, for instance, in determining whether a particular occurrence of the morpheme sequence above is /nʌ́hksp?ʌcyam/ or /nʌ́hkspcyam/, the difference between a rapid unstressed pronounciation of ?ʌ and its complete absence being very slight.

119

3.13. The distribution mode of phonemic-words. Phonemic-words are distributed in larger phonemic units, occurring as emic constituents of phonemic-phrases. The distribution of any particular phonemic-word consists in its actual occurrences as a constituent of different phonemic-phrases. The particular phonemic-word, as a member of the class of all phonemic-words, also has a potential for occurrence in phonemic-phrases as a manifestation of any phonological-word-type. That is to say, the lack of classificatory differences in phonemic-words implies that any phonemic-word has potential for occurrence in any position in phonological-phrase structure (see 2.13).

3.14. The relationship between phonemic-words and morphemic-words. In the introduction (0.71) the fundamental distinctness of phonemic and morphemic units was emphasized. However, another important characteristic of phonemic units is their close overall correlation with units of the morphemic hierarchy. This correlation is evident at all levels larger than the phoneme and increasingly evident at higher levels. Even at the level of syllables it is close enough that monosyllabic morphemic-words[4] may be taken as a basic sample to use as a first approximation to emic syllable structure. Likewise, a great percentage of the significant structure of phonemic-words may be seen by considering the phonemic constituency of classes of morphemic-words.

One reason for this close correlation is that morphemic units when used as a sample for analysis of phonemic units, consist largely in citation forms or other sorts of single-word sentences. These forms constitute not only morphemic

[4]Rather monomorphemic words which are about one syllable in length, since in early stages of language analysis syllable structure has not been determined.

units, but also phonemic ones. The phonemic units involved are primarily units larger than syllables, namely phonemic-phrases (or a unit on an even higher level), since nothing smaller than a phonemic-phrase really "occurs" in TM. Consider as an example the class of citation forms which consist of monosyllabic morphemic-words. This class constitutes in the TM phonemic hierarchical structure a class of phonemic-phrases consisting of single phonemic-words consisting of single syllables. They probably also constitute simultaneously morphemic units on more than one level of structure as well.

Some of the evidence of close correlation between the two hierarchies at the level of phonemic-words are the following characteristics:

1. Many if not most phonemic-words are equal in length to single morphemic-words.

2. Phonemic-words end at morphemic-word boundaries in the overwhelming preponderance of cases.

3. Many phonemic-words contain more than one morphemic-word. Few if any morphemic-words occur as more than one phonemic-word.

4. Moreover, though boundaries of phonemic-words are quite flexible with respect to morphemic boundaries, there are limits to this flexibility. One such limitation is that certain morphemic-words seem always to constitute entire phonemic-words. Examples are {pán} 'who', and {tí} 'what', in /pán pán/ 'whoever', /pán tí/ 'whatever'.

One minor problem rising from the relationship between phonemic-words and morphemic-words is that of citing examples of phonemic-words in a descriptive statement. Any particular cited "meaningful" segment of language is a morphemic unit of some sort. As a morphemic unit, the transcription employed to represent it has in all occurrences the same morphemic significance. The same morphemic segment,

121

however, cited as a phonemic segment, must be considered as only one phonemic actualization of the morphemic units in question. For example, the sequence of morphemic units {náhksp ʔác yám} cited phonemically as /náhksp ʔác yám/ does not indicate that this is the only possible representation of the composition of this morpheme sequence in terms of phonemic-words. /náhksp ʔàcyám/, as a matter of fact, is a more common one.

Careful distinction between phonemic- and morphemic-words may allow for clarification of some problematical areas of word definition. An example from TM is such a form as {hæc} 'and'. This morpheme does not fit the traditional definition of a word as a "minimal free form". Another way to state this is that it does not constitute a complete phonemic-phrase in any of its occurrences. Phonologically, it always occurs as part of a phonemic-word including in addition another morphemic-word or words. Morphemically, it is part of a complex form larger than a word, being a conjunction connecting two words, phrases, or clauses. Its relationships to the two hierarchies is thus quite distinct.

3.2. Phonological-word-types. There are three phonological-word-types in TM. They are distinguished from each other by differences in their relationships to the structure of phonological-phrase-types. They are labelled Head-phonological-word-type,   Sub-head-phonological-word-type, and Non-head-phonological-word-type, reflecting their functions in phonological-phrase-types. All three of these phonotagmemic units are illustrated in the phonemic-phrase /mǔ·khup hǽʔævè̀ʔe yʔîht $\frac{\hat{}}{3}$/ 'he was drunk'. In this illustration, /yʔîht/ manifests a Head-phonological-word-type, /mǔ·khup/ manifests a Sub-head-phonological-

word-type, /hǽʔævèʔe/ manifests a Non-head-phonological-word-type.

There are notational additions introduced here in the citing of phonemic-phrase units. (Previously cited sequences of phonemic-words have been presented in a more abstract transcription, as phonemic-word sequences but with no reference to phonemic-phrase characteristics of those sequences.) There are two notational additions. One is that the phonemic-words manifesting the Head and Sub-head-phonological-word-types are marked on their center syllables with (ˆ) and (ˇ) respectively instead of the normal designation for full-stress (ˊ).[5] These markings, indicating further contrasts in the accentual system, also are of relevance for the placement of intonational contrasts. They are discussed in 4.111b. Sub-script numerals designating emic pitch levels, numbered 1-3 from low to high, following the phrase, indicate its intonational characteristics. Intonation will be described in 4.3.

Boundaries of emic units in this description are thus indicated as follows: phonemic-phrases are separated by sub-script numerals following each phrase, phonemic-words are separated by space; boundaries of syllables within phonemic-words are predictable, and are unmarked, except for the special case described in 3.112, which is indicated by hyphen.

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[5] This usage of symbols to mark stress characteristics is not in complete accord with usage of other linguists. In Bloch and Trager's Outline of Linguistic Analysis, Linguistic Society of America Special Publications, Baltimore, Maryland: Waverly Press, 1942, as well as in several later descriptions of English stress characteristics, the symbol (ˊ) is used to designate a higher degree of stress than (ˆ). In this presentation, the compound symbols (ˆ) and (ˇ) are used as a representation of higher-level function of stress characteristics, while the simple symbols (ˊ) and (ˋ) designate stress function on a lower phonemic-word level of structure.

3.21. The feature mode of phonological-word-types.
Phonological-word-types, like syllable-types, have a slot-
plus-class structure as units per se; they also have an emic
constituency of lower-level phonotagmemic units. Con-
sidered as a unit per se, a phonological-word-type has as
its slot component a meaningful position in the structure of a
phonological-phrase-type--that is a Head, Sub-head, or
Non-head slot; its filler class is a list of phonemic-words.
The emic constituents of phonological-word-types are
syllable-types.

3.211. Phonological-word-types as phonotagmemic units
per se. The distinctiveness of the various phonological-
word-types depends on the different significant slots in
phonological-phrase-types. (There are no significant dif-
ferences in the internal structure of the filler-class com-
ponents of these phonotagmemic units.) There are three of
these slots, each of which determines a phonological-word-
type. They are a Head slot, determining the Head-phono-
logical-word-type, a Sub-head slot, and a Non-head slot.
The three slots are distinguished from each other in terms
of their relationships to the structure of phonological-
phrase-types. The Head slot is obligatory to the structure
of phonological-phrase-types, whereas the other two slots
are not. This distinguishes the Head slot from the Sub-head
and Non-head slots. Thus a phonemic-phrase composed of
only one phonemic-word, like /mnâhksup $\widehat{3}_{-1}$/ 'you're going!
(are you?)' manifests only a Head-phonological-word-type.
A second source of distinctiveness for the various slots
is their relationships to the intonational system. Intonation
contrasts occur at the Head and Sub-head slots. Closely
related to this are positional characteristics of the slots. In
phonemic-phrases manifesting a Head-phonological-word-
type but not a Sub-head one, the intonational contrast usually

occurs on the last phonemic-word of the phrase,[6] this being then the head of the phrase. For instance, /hǽʔæhì ʔʌcʌn-gócuvâ·mpy $\overset{\frown}{2}_{-1}$/ 'that's all I want to say'. Also in pho-nemic-phrases manifesting both a Head and a Sub-head phonological-word-type, contrastive intonation usually oc-curs on the last phonemic-word in the phonemic-phrase; this may manifest either the Head or the Sub-head-phono-logical-word-type. In cases in which the last phonemic-word manifests the Sub-head-phonological-word-type, the manifestation of the Head-phonological-word-type is the first phonemic-word in the phrase. Head and sub-head ele-ments are distinguished in terms of relative intensity and of the amount of pitch gradation on the phonemic-word con-cerned not occurring phrase finally. Examples are:

/hǽ̂ʔæhì ʔʌcʌngócuvǎ·mpy $\overset{\smile}{2}_{-1}$/ 'that's all I want to say'

/hǽ̆ʔæhì ʔʌcʌngócuvâ·mpy $\overset{\frown}{2}_{-1}$/ 'that's all I want to say'

3.212. Emic constituents of phonological-word-types. Since the filler classes of all phonological-word-types are essentially the same, their emic constituency is also the same and may be expressed in the following formula:[7] (St in this formula is an abbreviation of "syllable-type".)

$$\underline{+} \text{ St IV} \quad \underline{+} \text{ St III} \quad \underline{+} \text{ St II} \quad + \text{ St I} \quad \underline{+} \text{ St V}$$

There is only one obligatory element in this formula, + St I.

[6] For an illustration where this is not the case, however, see the first phonemic-word of the text in Chapter 5.

[7] That is, significant differences in filler classes would be also differences in the phonotagmemic constituency of the various phonological-word-types. This does not mean that the list of phonemic-words mani-festing the phonological-word-types have been shown on an empirical basis to be the same. Rather its significance is that no convincing evidence has been found for positing differences in phonotagmemic con-stituency for the three phonological-word-types.

There are two characteristics of phonological-word-types that are not indicated in this formula. One is that the order of elements is not rigidly fixed for all constituents, though it is not completely free either. The other is that there may be more than one actualization of most of these phonotagmemic constituents in particular manifestations of the phonological-word-types, with the exception that there is only one occurrence of St I in any manifestation.

The principal aberrations in order of syllable-types from that shown in the general formula just above are the following: (a) an occurrence of St V between a St II or St III and a following St I; (b) an occurrence of St III, optionally preceded and/or followed by St V, following St I. Illustrations of (a) are: /kȧhpʌngȧhsm/ 'in town', manifesting St II-StV-StI; /kupùhsʌndĭk/ 'a variety of lizard' (more literally 'a head-iron lizard', named for its horny crest), manifesting St IV-St III-StV-St I. Illustrations of (b) are: /nȧhkspcȅʔe/ 'he's going (emphatic)', manifesting St I-St III; /nȧhksp-ʔʌcyȁm/ 'I'm going now', manifesting St I-StV-St III.

In both these cases there is evidence that the alternations of order reflect differences in layerings of structure intermediate between phonological-word and syllable-level structure. The form /kupùhsʌndĭk/ might be more accurately treated as consisting of two constituents at the phonological-word level, kupùhsʌn and dĭk. This parallels its morphemic constituency. Forms like /nȧhkspcȅʔe/ could be treated as a sort of micro-phonological-word structure in which the St III is sort of tacked on to a normal phonological-word-type variant, taking the clue for interpretation again from the morphemic structure involved.

The decision not to represent these materials in terms of more layerings of structure is essentially the same as that involved in the discussion of phonotagmemes in Chapter 1. That there are evidences of more levels of hierarchical

126

ordering than are presented here is granted. However, in my judgement, the evidences for further hierarchical levels between the levels treated explicitly in this description are not nearly as great as for those levels described. Also, the addition of complicated hierarchical arrangements between the levels discussed would greatly complicate the discussion and add little to the primary focus of attention of the study.

There are definite limitations in the freedom of order of elements within the phonological-word-type formula. In a sequence of full-stressed syllables within a phonemic-word, the last one is the manifestation of St I. This is borne out by internal composition and by correlation to phonological-phrase structure. Occurrences of St IV are restricted to positions preceding manifestations of any other syllable-type.

Considerable variation is shown in the number of manifestations of particular syllable-types in phonemic-words. The form /nyʌ́hkskʌ́skóhtinuva/ 'they all went again also', manifests two occurrences of Syllable-type II and three of Syllable-type V. This variant of a phonological-word-type may be described as St II-St II-St I-St V-St V-St V. Multiple occurrences of St III are shown in /ʔaksnàsʌsú·sʌn/ 'mouth organ'. Multiple occurrences of St IV are shown in /tʌdʌyaknʌpét/ 'he already baptized him'.

3.213. Criteria for differentiation of phonotagmemic units at various levels of structure. In going from the smallest phonotagmemic units to larger ones, there are changes in the sorts of evidence and criteria used to distinguish one phonotagmemic unit from another of the same level. At the level of phonotagmemes, the various phonotagmemes are distinguished from each other by their relationships to syllable structure, by considerable differences in the composition of the filler classes involved, and by differences in

composition, reflected in this case in expansion forms. The class of fillers of nucleus phonotagmemes is almost completely different from that of onsets and termini. Also there are considerable differences in the filler classes of onset and terminus phonotagmemes. In addition there are differences in expandability which distinguish the various phonotagmemes. Terminus phonotagmemes for instance show considerably more expandability than onset phonotagmemes. Also, different terminus phonotagmemes are distinguished from one another in terms of this characteristic. (A fuller explanation of this was given in 1.21).

At the level of syllable-types, there is not so varied a set of characteristics to distinguish between the various syllable-types. Specifically, there is no difference in basic internal composition of the various syllable-types. All consist of an obligatory onset phonotagmeme, an obligatory nucleus phonotagmeme, and a non-obligatory terminus phonotagmeme. However, they are distinguished from one another by differences in relationship to significant positions in phonological-word-type composition, these differences being correlated with differences in expandability of the phonotagmemes constituting the various syllable-types. This is reflected in the description of the phonotagmemic constituency of the various syllable-types as:

Syllable-type I: + Onset I   + Nucleus I   ± Terminus I

Syllable-type II: + Onset I   + Nucleus I   ± Terminus II

etc. Also at this level there is no sharp difference in distributional characteristics which would form a basis for the classification of the filler elements of the various syllable-types, the syllables, into sharply different classes of items, like the vowel and consonant classes of phonemes. (For a fuller description see above 2.21.)

At the level of phonological-word-types, there is a further restriction in the sorts of evidence which separate different phonotagmemic units. For insofar as analysis to date has been able to show, there is no significant internal difference in the structure of the three phonological-word-types.[8] The contrastiveness of the various types depends only upon the differences in their slot-components, considered as units, that is, on different slots in phonological-phrase-type structure.

This constitutes the minimum which can be considered as determining a difference in phonotagmemic units. It parallels a hypothetical situation in morphemic-tagmemic structure in which the filler classes of Subject and Object positions are completely the same, but in which the meaningful and positional relationships denoted by the labels "Subject" and "Object" are of structural significance in the language. In such a case, distinct Object and Subject tagmemes would be set up, in spite of the complete identity of their filler classes.[9]

3.22. The manifestation mode of phonological-word-types. A phonological-word-type is manifested by the occurrence of any member of its filler class component. When any such phonemic-word occurs, the phonological-word-type occurs. There are thus as many different occurrences of a phonological-word-type as there are different phonemic-words in its filler class. However, there are

[8] Unless the interpretation of the morphophonemic structure of nouns versus verbs etc., would show such a sub-structuring.

[9] It should be added here that the contrastiveness of the various slots in phonological-phrase-structure is closely tied to the distinguishing characteristics of the intonational system, including the phrase-stress, and that thus there are phonetic differences which distinguish the actualizations of the distinct phonological-word-types.

also variants of another sort which are of more structural importance. Just as it was most useful to describe the manifestations of phonotagmemes in terms of various patterns of simple and expanded variants, and to describe manifestations of syllable-types in terms of various occurring "CV" patterns, the manifestation mode of phonological-word-types is here subdivided according to the particular combinations of syllable-types occurring. Since all TM phonological-word-types are considered to have only one emic constituency (there are no significant differences in filler class postulated), the examples of the Head-phonological-word-type given here may be considered as representative of Sub-head and Non-head-phonological-word-types as well.

There is only one manifestation variant for monosyllabic-words, namely St I.

St I   mó·k 'corn', pískk 'flea', mcó·ʔmp 'you are leaving'

Phonemic-words of two syllables in length comprise the following phonological-word-type variants:

StI-StV   píhʌn 'book-bag', mpaéʔaetup 'you will sweep', píʔkhi 'small'

StIV-StI   kuhúp 'hat', mutúʔk 'first', mguʔísp 'you are visiting'

StIII-StI kʌkvóp 'stole (noun)', càptʌhk 'church', tʌkʔám 'at home'

StII-StI   cíʔkspí·hntk 'firefly', kópkʌhsm 'on top of a mountain', cápcsóh 'red oak'

Phonemic-words of greater length show large numbers of possible different combinations. This is due both to the fact that as the length of the sequence increases, the theoretically possible number of combinations increases exponentially, but also because many forms have more than one

occurrence of a syllable-type. Some examples of phono-
logical-word-type variants containing three syllables are:

StI-StV-StV	pʌ́hkhʌdup 'they are sick', mnʌ́hkṣnuvap 'you are going also'
StIV-StI-StV	nʌsóya 'shirt', tukoɟ·hntykʌn 'chair'
StIII-StI-StV	mò·k-yú·va 'plowing cornfields', ʔìṣ-pʌ́hkʌn 'teaching'
StII-StI-StV	tóhkṣpʌ́·mpa 'making food', tú ʔkkʌ́hpʌn 'one village'
StIV-StIV-StI	tʌdʌʔíṣ 'he already saw it', hæekuhúp 'the hat'
StIV-StIII-StI	nyakʔìspʌ́hkp 'I am teaching'
StIV-StII-StI	kunú·ʔkṣté·ʔ 'holy father'
StII-StV-StI	kʌ́hpʌŋʌ́hṣm 'in town', kʌ́pʌkʌ́ʔahk 'mamey'[10]
StIII-StV-StI	tʌ̀kʔakʌ́ʔʌ 'door'

In longer forms there is even greater variability. No
effort is made here to list these. However, a few examples
may show something of the sort of variation which occurs.
The phonemic-word càptʌkʔá·gi 'outside the church' mani-
fests a phonological-word-type variant StIII-StIII-StI-StV;
nyanyàstʌ́ʔyʔukvá·hni 'he began to lower himself' manifests
StIV-StIII-StII-StV-StI-StV.[11]

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[10] The word for 'mamey' occurs also as kʼípkáʔahk (see 1.121).

[11] The word nyanyàstʌ́ʔyʔukvá·hni also occurs as nyanyastʌ́ʔyiʔuk-vá·hni (see 3.114).

4

Phonemic–Phrases and Phonological–Phrase–Types

Phonemic-phrases are composed of one or more phonemic-words and constitute the fourth level in the TM phonemic hierarchy. A phonemic-phrase consisting of one phonemic-word is /mnʌ̂hksup $\widehat{3}_{-1}$/ 'you're going!'; a phonemic-phrase composed of two phonemic-words is /hǽ?æhi ?ʌcʌngócuvâ·mpy $\widehat{3}$/ 'that's all I want to say'; an example composed of three phonemic-words is /mnʌ̂hksup vàkvî·nm kêp $\widehat{3}$/ 'are you going to Oaxaca City tomorrow?'.[1]

Units of the fourth level in the TM phonotagmemic hierarchy are phonological-phrase-types. Their emic constituents are phonological-word-types. In the composition of phonological-phrase-types there is only one obligatory constituent, a Head-phonological-word-type, plus two non-

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[1] The symbols added for the treatment of phonemic-phrases were introduced above in connection with phonological-word-types. The additional symbols are (ˆ) and (ˇ), which mark phrase-stress characteristics, and sub-script numbers 1–3, which indicate intonational pitch levels, number 1 designating the lowest level. The phrase-stress characteristics will be discussed in 4.1, the intonational system in 4.3.

obligatory constituents, a Sub-head-phonological-word-type and a Non-head-phonological-word-type. (These are the phonotagmemic units described in the preceding chapter.) All phonemic-phrases manifest a Head-phonological-word-type; some include manifestations of Sub-head and Non-head-phonological-word-types as well. Of the examples given above, /mnʌ̂hksup $\hat{3}_{-1}$/ 'you're going!' manifests only a Head-phonological-word-type; /hǽ?æhi ?ʌcʌngócuvâ·mpy $\hat{3}$/ 'that's all I want to say' manifests a Sub-head-phonological-word-type as well; /mnʌ̂hksup vàkvɪ́·nm kȇp $\hat{3}$/ 'are you going to Oaxaca City tomorrow?' contains two manifestations of the Non-head-phonological-word-type as well as a manifestation of the Head-phonological-word-type.

In this and in previous chapters, the basic obligatory constituents at each level have been given special designations, distinct for each level. A phonemic-phrase has a head, a phonemic-word a center, a syllable a nucleus. (Syllables are distinct from other levels in that they have two obligatory constituents, a nucleus and an onset.) These terms are used in specific reference to particular levels of structure. The term 'head' is used only in reference to a phonological-word-level unit, viewed in relation to its position in phonological-phrase structure.

Previous to the more detailed treatment of phonemic-phrases, two other characteristics of phonological-phrase-structure should be pointed out. One is that a phonemic-phrase may contain more than one manifestation of the Sub-head-phonological-word-type and of the Non-head-phonological-word-type. The second characteristic is that the order of the emic constituents in phonological-phrase-structure is not rigidly fixed. For instance, in phonemic-phrases containing a sub-head as well as a head-phonemic-word the sub-head may precede or follow the head. An example in which the head-phonemic-word precedes the

133

sub-head is /hǽ?æhi ?ʌcʌngʌ̌hcp $\widehat{3}$/ 'that's what I say'. An example in which the sub-head-phonemic-word precedes the head is /cǎ?am ?ʌcʌnhúyuvâ·mpy $\widehat{2-1}$/ 'I want to buy bananas'. Also it may or may not be separated from the head by non-head-phonemic-words. Further illustrations of both of these characteristics will be given in later paragraphs, under the manifestation mode of phonological-phrase-types, 4.22.

4.1. Phonemic-phrases. 4.11. The feature mode of phonemic-phrases. The feature mode of phonemic-phrases, like that of all emic units, consists of identificational-contrastive features which distinguish phonemic-phrases as a level of structure from all other levels and which also distinguish each phonemic-phrase from every other phonemic-phrase. Phonemic-phrases are distinguished from other levels of units in hierarchical structure by (1) general pho-netic characteristics, including prominently those of timing, of phrase-stress characteristics, and of pause, (2) their emic constituency in terms of smaller phonemic units (pho-nemic-words), and (3) intonational characteristics. Each phonemic-phrase is distinguished from other phonemic-phrases by its emic constituency, that is by the particular phonemic-words of which it is composed, and by its phrase-stress.

4.111. The phonetic characteristics of phonemic-phrases. The phonotagmemic approach to phonology pre-sented here assumes a basis in phonetic behavior for all linguistic units. Pike has labelled phonological units of the size of TM phonemic-phrases as "abdominemes", and con-siders the basic physiological movement involved to be ini-

tiated by sub-thoracic musculature (Pike Language 9.3).[2] Again, as in the cases of syllables and phonemic-words, the investigation of this phonetic base has not been included in the present study. There are nevertheless certain phonetic characteristics of phonemic-phrases which are observable by non-laboratory methods and which serve to help identify phonemic-phrases.

1. Timing characteristics of phonemic-phrases. Added length of the central syllable of head and sub-head phonemic-words is the most easily observed timing characteristic of phonemic-phrases. There is, however, considerable variation in the actual length of such syllables, depending on the phonemic complexity of the constituents of the syllable itself, as well as the particular preceding and following phonemes (including presence or absence of phonemic vowel length), and the amount of expressive emphasis given the head and sub-head phonemic-words. Differences of this sort are great enough that, in a group of syllables of the shapes /ʔắc/ 'I' and /ʔắ·c/ 'we', as measured by the author from spectrographic evidence, some occurrences of /ʔắc/ as head of a phonemic-phrase are actually longer than examples of /ʔắ·c/ in non-head position. Moreover, in the particular examples measured, there was no evidence of extreme variation in length due to emphasis.

Timing characteristics of phonemic-phrase-final segments have not been subjected to the careful sort of analysis necessary to determine whether or not there is a significant slowdown at the boundaries of phonemic-phrases. To date, observations, both impressionistic and spectrographic, have

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[2] More recent studies have questioned the importance of the abdominal musculature in producing such units. W. F. Twaddell, "Stetson's Model and the 'Supra-Segmental Phonemes'," Language, 29.415-53, (1953). Peter Ladefoged, M. H. Draper, D. Whitteridge. "Syllables and Stress," Miscellanea Phonetica, 3.1-14, (1958).

not shown any consistent difference of this sort between the boundaries of phonemic-words and those of phonemic-phrases.

2. Phrase-stress features of phonemic-phrases. Besides the system of three degrees of stress significant in the composition of phonemic-words, there are two further levels of stress in the TM accentual system. These are relevant at the level of phonemic-phrases and are labelled phrase-head stress marked (ˆ) and phrase-sub-head stress, marked (ˇ). Phrase-head stress and phrase-sub-head stress designate positions of extra emphasis relative to phonemic-phrase structure. Every phonemic-phrase contains one phonemic-word of greater prominence than the remainder of the phrase. This phonemic-word is the head of the phrase and is characterized by phrase-head stress. In addition, a phonemic-phrase may also contain another phonemic-word, appreciably more prominent than other phonemic-words in the phrase, yet not of the order of prominence of the head-phonemic-word. Such a phonemic-word is characterized by phrase-sub-head stress. In phonemic-phrases containing a head-phonemic-word but no sub-head-phonemic-word, the head phonemic-word is usually the last phonemic-word in the phrase.[3] In phonemic-phrases containing both a head and a sub-head-phonemic-word, either of these may be the last phonemic-word in the phrase. See examples on page 134.

This results in a total accentual system of five elements, three on the level of phonemic-word structure and two on the level of phonemic-phrase structure. The phonemic-word level stresses are connected with the distinctive identification of different phonemic-words. The phonemic-phrase stresses are associated with contrastive identification of

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[3] For an example which does not follow this pattern. note the first phonemic-word in the illustrative text (5.1).

different phonemic-phrases and with intonational structure.
The locus of occurrence of all these stress elements is on
syllables. However, the structural significance of the
stresses is associated with these two higher levels of
structure.

3. Pause as a characteristic of phonemic-phrases.
Pause is associated with TM phonology in three areas. It is
a non-obligatory characteristic of phonemic-phrase bound-
ary; it is a non-obligatory characteristic of hesitation
forms; it is a characteristic of stutter forms.

Pause as a non-obligatory characteristic of phonemic-
phrase boundary occurs in combination with other factors
which distinguish phonemic-phrase boundary. These are
mostly intonational features, along with phrase-stress
characteristics and the internal composition of phonemic-
phrases. The end of a phonemic-phrase always corresponds
with the end of an intonation contour.

Pause as a non-obligatory characteristic of hesitation
forms also is one of many factors which identify such forms.
Other characteristics of hesitation forms include factors of
timing, that is the prolongation of phonemes or phoneme se-
quences, as well as stress and pitch characteristics. These
hesitation phenomena occur in several sorts of situations
with somewhat different phonetic characteristics in each
case.

One typical occurrence of hesitation is as the lengthen-
ing of a phoneme--usually a nasal--within a phonemic-word,
with sustention of the pitch of the preceding syllable and no
actual cessation of sound. An example of this is /ʔʌ̂·c
ʔòcʌn=nvîdʌt $\hat{3}_{-2}$/ 'we went for a little jaunt'. The hesita-
tion is marked by "=". A second very frequent occurrence
of hesitation is in sequences without stress or with reduced-
stress, with sustained low pitch, a tendency toward trilliza-
tion in voice quality, with a considerable lengthening of the

137

final syllable of the sequence, and in most cases, an actual pause in speech. Examples are /ʔaṣvæ̀ʔævè̀ʔe=/ 'well then', /kù̀ʔuvè̀ʔe=/ 'when'. These forms do not show the stress characteristics of phonemic-words. They have no central-stressed syllable, (Syllable-type I). Hesitation characteristics may also occur on full phonemic-words, or on full phonemic-phrases.

There is another sort of material in TM which is similar to these hesitation forms in general character, but is not considered under this category. It is similar in that it is also used as a sort of time filler element, indicating indefiniteness of choice of lexical items. The item under consideration is the employment of forms with an empty root as the base of the lexical form. This root form is {væʔæ}, perhaps best translated as 'what-you-call-it'. Examples are of the nature of /nvæ̂ʔyumup $\hat{3}_{-1}$/ 'we will what-you-call-it', /tùmvæ̂ʔæ $\hat{2}_{-1}$ tùm hermâno $\hat{3}_{-1}$/ 'very what-you-call-it, very brother(ly)'. Such forms however do not necessarily show any of the phonetic characteristics of hesitation phrases described here, but most often have the general phonetic characteristics of phonemic-phrases in general. However, the form {væʔæ} does often occur with hesitation characteristics.

Pause as a characteristic of stutter forms or interrupted phrases is associated with yet a different set of characteristics. In this situation the pause is an abrupt interruption of the stream of speech, with no patterned decay, prolongation, or modification of the pitch sequence. It is usually followed by a rapid repeat of the phrase, or often a slightly different phrase.

4.112. Emic constituents of phonemic-phrases. As mentioned earlier, the phonemic-phrase is composed of one or more phonemic-words. Thus every phonemic-phrase

contains a phonemic-word as the head of the phonemic-phrase. Some phonemic-phrases contain in addition a sub-head-phonemic-word and non-head-phonemic-word or words. Each different sequence of phonemic-words comprises a different phonemic-phrase. This makes the number of actual and possible phonemic-phrases extremely large. In one sense, the feature mode of phonemic-phrases includes the listing of all these combinations, although this is not a fruitful type of description. Illustrations of some sizes of phonemic-phrases are presented here. Phonemic-phrases consisting of one phonemic-word are: /mîhʌ $\widehat{3-1}$/ 'come here', /kû?us $\widehat{2-1}$/ 'full, satiated', /tʌdʌyak?îspîk $\widehat{2-1}$/ 'he already taught him'.

Illustrations of phonemic-phrases consisting of more than one phonemic-word are: /maé·?ksta mî·cê?e $\widehat{3-2}$/ 'excuse it please', /hæcvîthú·yvavé?e nyîhks $\widehat{3}$/ 'and he went to buy clothing', /mnʌ́hksup vàkvî·nm kêp $\widehat{3}$/ 'are you going to Oaxaca City tomorrow?'.

4.113. Intonation in the feature mode of phonemic-phrases. Every phonemic-phrase is coterminous with an intonation contour. The placement of head and sub-head elements within the phonemic-phrase and therefore of stress characteristics is also associated with intonational structure.

Intonation in this description is treated not just as part of the phonemic-phrase level of phonemic structure, however. Because of the special structural characteristics of intonation (there is an inventory of contrastive pitches—intonemes—and meaningful combinations of these), these pitch sequences are abstracted as a special structure labelled an intonation system. This is described in 4.3. At the same time, the connections between the intonation system and phonemic-phrase structure are very definite and important. The intonation system comprises an important part of the feature mode of phonemic-phrases.

Two phonemic-phrase occurrences alike except for intonation are considered to be the same phonemic-phrase. Thus /mnʌ́hksup kêp $\hat{}$/ 'you're going tomorrow?', and /mnʌ́hksup kêp $\hat{}_{-1}$/ 'so you're going tomorrow!' constitute occurrences of the same phonemic-phrase. This is in a limited sense analogous to the consideration of syllables composed of the same sequence of phonemes but under different stress characteristics as occurrences of the same emic syllable. Yet there is a basic difference between the treatment of stress characteristics in this respect and the treatment of intonation characteristics. For, although stress characteristics are not considered as distinguishing between different emic syllables, they are considered as relevant in the distinguishing between different phonemic-words and between different phonemic-phrases. Thus two phonemic-words different only by stress placement--for instance ʔápit 'thorn' vs. ʔapít 'rolled up'--are considered to be separate phonemic-words. Similarly, /hæ̂ʔæhi ʔʌ̀-cʌngócuvǎ·mpy $\hat{}_{-1}$/ and /hæ̌ʔæhi ʔʌ̀cʌngócuvâ·mpy $\hat{}_{-1}$/ 'that's what I want to say' are considered as different phonemic-phrases. The intonational system is split off more completely from the other phonological structure because of its own limited phonological and lexical structure, forming as it were, a system of its own in contrast to the totality of phonological and lexico-grammatical structure.

4.12. The manifestation mode of phonemic-phrases. The manifestation mode of phonemic-phrases consists in the various actualizations or occurrences of such units. In this sense it is very analogous to the manifestation mode of other units in the phonemic hierarchy. From one point of view, there are as many different manifestations of a phonemic-phrase as there are occurrences of it. Also, there are certain ranges of variability describable as conditioned

variants under different conditions of occurrence, as for example probably in different significant positions in the structure of larger units,[4] or under different stylistic conditions. A major relevant source of sub-emic variation in the manifestations of phonemic-phrases is that shown under different intonational characteristics, since phonemic-phrase occurrences which are alike except for intonation are considered to be the same phonemic-phrase.

With respect to the range of variability of a phonemic-phrase, the same restriction applies as has been relevant to all other units of the phonemic hierarchy. Inasmuch as a different sequence of phonemes defines a different syllable, a different sequence of syllables defines a different phonemic-word, a different sequence of phonemic-words defines a different phonemic-phrase, the range of sub-emic variation of a phonemic-phrase is limited to differences which do not entail differences in its composition in terms of phonemes.

4.13. The distribution mode of phonemic-phrases. The distribution mode of phonemic-phrases consists in the actual and potential distribution of such units in higher-level units of the phonemic hierarchy, if indeed such units are attested in TM phonology. Again, since this description does not go into the description or investigation of such a level, no definite statements can be made concerning the distribution mode of phonemic-phrases.

4.2. Phonological-phrase-types. Phonological-phrase-types, like other phonotagmemic units, are slot-plus-class correlations. In this case, the correlation is that between a significant slot in the structure of a larger unit and a class component consisting of a filler class of phonemic-phrases.

[4]Since this description stops at this level, these distributions have not been investigated.

141

Since this description stops at the level of phonological-phrase structure, there is no adequate definition of the next higher level structure to which the slots in question are related.

There are, however, some general characteristics of such units which can be described or surmised from available evidence and in part hypothesized on the basis of the pattern of structure of the smaller phonotagmemic units. First, such a unit is probably of the order of a phonological sentence, although it would seem to be in a great many cases considerably longer than sentences defined by grammatical criteria. Also the length of such units seems to vary considerably from speaker to speaker and from situation to situation. This unit would probably also show a very high correlation to stretches of speech separated by inhalations of breath. Also, there seems to be a tendency for intonation contours to occur in sequences with the last contour of the sequence being $\hat{2}_{-1}$. This is borne out in the illustrative text in 5.

4.21. The feature mode of phonological-phrase-types. In view of the lack of evidence for the distinction of phonological-phrase-types from occurrence in higher level units of phonotagmemic structure, the description of the feature mode will build mostly on the emic constituents of phonological-phrase-structure. A phonological-phrase-type has three phonological-word-type constituents.   These are a Head-phonological-word-type, which is an obligatory constituent, in addition to a Sub-head-phonological-word-type and a Non-head-phonological-word-type, which are non-obligatory constituents of phonological-phrase-type structure. This may be represented in a formula as follows:

$$\underline{+} \text{ Sub-head} \quad \underline{+} \text{ Non-head} \quad + \text{ Head}$$

142

For the interpretation of this formula, there are two qualifications. One is that there may be more than one occurrence of the Sub-head and Non-head phonological-word-types in a particular manifestation of a phonological-phrase-type. The other is that there is variation in the order of the elements in the formula. These will be illustrated as part of the description of the manifestation mode of phonological-phrase-types.

4.22. The manifestation mode of phonological-phrase-types. Every occurring phonemic-phrase manifests a phonological-phrase-type. Thus there are as many different manifestations of phonological-phrase-types as there are different phonemic-phrases. Also there are variants of phonological-phrase-types in the various combinations of obligatory and non-obligatory elements in these manifestations. Thus /hǽ?æhi ?ʌcʌngócuvâ·mpy $\widehat{2}_{-1}$/ 'that's what I want to say' is a manifestation of the shape Non-head--Head. /mnʌ́hksup vàkví·nm kȇp $\widehat{3}$/ 'are you going to Oaxaca City tomorrow?' is a variant of the shape Non-head--Non-head--Head. Illustrations of some other variants are:

Sub-head--Head /hǽ?æhi ?ʌcʌngʌ̂hcp $\widehat{3}$/ 'that's what I say';

Sub-head--Non-head--Head /tǔhpa cyʌ́?ʌvȇ?e y?ĩht $\widehat{3}$/ 'he was a soldier';

Head--Sub-head /?ʌ̂cȇ?e hænvincʌ̆n $\widetilde{2}_{-1}$/ 'I am the owner';

Non-head--Non-head--Sub-head--Non-head--Head /?avér pʌ́n tǐvȇ?e hændá·?m hʌ̂htup $\widehat{2}_{-1}$/ 'to see what's wrong with the lady'.

4.23. The distribution mode of phonological-phrase-types. The distribution mode of phonological-phrase-types consists in their actual and potential occurrence in the

composition of larger phonotagmemic units. Since these larger units have not been determined for TM phonology, there is no accurate information concerning the distribution of phonological-phrase-types. It can only be assumed that such larger units exist, and that the distribution of phonological-phrase-types is related to such larger units.

4.3. Intonation. Intonation is an important component of the structure of TM phonemic-phrases. Every phonemic-phrase is coterminous with an intonation contour. They are the most readily perceived feature or set of features distinguishing these units. However, it is not sufficient to consider the intonational characteristics as merely part of the structure of phonemic-phrases. TM intonation, like that of English, constitutes a separate layer of structure overlaid on the normal language structure, and having its own phonology and its own meaningful units. However, the structure as presented here for TM is not very complex in either area. The basic units in the phonological area in TM intonation are three pitch levels and the two phrase-level stress characteristics. The morphemic units are combinations of the basic phonological units to form meaningful sequences or contours.

It would be possible to describe the structure involved in the intonational system in terms of a slot-class approach to analysis, for there are classes of units distributed in significant slots of structure--else there would be no contrast. However, it does not seem expedient to employ for the description of a system as simple as that of TM intonation a descriptive model more complicated than the actual data itself. Therefore no explicit reference will be made in this section to slot-class structure nor to modes of intonational units.

4.31. The pitch contrasts. Contrastiveness of the three

relative levels of TM intonation may be illustrated on the last full-stressed syllables of phonemic-phrases, that is on the central syllables of final phonemic-words in phonemic-phrases. Intonational characteristics are marked by subscript numerals following phonemic-phrases. The intonational pitch levels are numbered 1-3, from low to high pitch.

Contrast between pitch levels 2 and 3 is shown by:

$$/\text{mn}\hat{\Lambda}\text{hk\d{s}up } \hat{3}_{-1}/ \text{ 'so you're going!'}$$

$$/\text{nn}\hat{\Lambda}\text{hk\d{s}up } \hat{2}_{-1}/ \text{ 'I'm going'}$$

The first of these intonation contours seems to indicate extreme emphasis. It is the intonation most often used in questions. The second is the normal or most common intonation of simple statements.

Contrast between pitch levels 2 and 1 is shown by:

$$/\text{mn}\hat{\Lambda}\text{hk\d{s}up } \hat{3}_{-2}/ \text{ 'you're going'}$$

$$/\text{mn}\hat{\Lambda}\text{hk\d{s}up } \hat{3}_{-1}/ \text{ 'so you're going!'}$$

There is no equally good contrast available between levels 1 and 3. There is a contour marked $\hat{3}$ and one marked $\hat{2}$; these contrast with $\hat{3}_{-1}$ and $\hat{2}_{-1}$ respectively. This inventory exhausts the contours for which good contrastive evidence has been found to date.

From three levels of pitch contrast there would be expected nine different combinations of two pitches. The fact that there are only five contours attested here suggests that there might be other possible interpretations of the data in terms of a simpler system. Two other alternates will be mentioned here. One would be to treat the materials in terms of two contrasts instead of three. The other would be to treat the contours as the basic units of intonational structure, instead of the pitch levels.

A consideration in terms of strictly two levels would not

145

handle the postulated contrasts $\widehat{3}_{-2}$, $\widehat{3}_{-1}$, and $\widehat{2}_{-1}$ very well. Indicating the two levels of such a system as "H" and "L", $\widehat{3}_{-1}$ could be represented as $\widehat{H}_{-L}$ and $\widehat{2}_{-1}$ as $\widehat{L}_{-L}$. $\widehat{3}_{-2}$ would be $\widehat{H}_{-H}$. $\widehat{3}$ would be marked as $\widehat{H}$ and $\widehat{2}$ as $\widehat{L}$. This treatment would distinguish the various contrasts, but would not have very good correspondence with the phonetic evidence.

A further alternation of this same general type would be to consider the system in terms of two pitch levels, along with a special feature of final down-glide. By marking the pitch sequences with down-glide to pitch level 1 by means of a special symbol $\downarrow$, the occurring contours could be indicated as follows: $\widehat{3}_{-1}$ as $\widehat{H}\downarrow$, $\widehat{2}_{-1}$ as $\widehat{L}\downarrow$, $\widehat{3}_{-2}$ as $\widehat{H}_{-L}$, $\widehat{3}$ as $\widehat{H}$, $\widehat{2}$ as $\widehat{L}$. Concerning this solution, it may be pointed out that it has better phonetic realism than the treatment in terms of two levels, but there is no economy of symbolization; the pitch level 1 has been replaced by a symbol for down-glide to low pitch. The attractiveness of such a treatment depends to great extent on the structure of units larger than phonemic-phrases. If, as seems quite possible, there is a restriction in the sorts of contours occurring at the boundaries of larger units, so that the symbol $\downarrow$ is a feature of the boundaries of such units, this treatment will be very sensible. In any case, however, it is not greatly different from a treatment in terms of three pitch levels. Since this investigation has not proceeded to the point of accurate description of the larger units, the question cannot be answered. Until it is, this interpretation should be considered as a possible alternative description of the intonation units.

In addition to the possibility of treating the materials in terms of a smaller number of contrasts in pitch levels, there is the alternate of treating the intonation system not in terms

of pitch levels, but in terms of total contours. Since there have been only five contours posited so far, this would not be a very difficult task.

However, there are some advantages to the treatment in terms of levels. One is that the phonetic evidence points quite strongly to at least some distinction of levels. The examples given above of the contours marked $\overset{\frown}{3}$-2, $\overset{\frown}{3}$-1, $\overset{\frown}{2}$-1 show perceptible differences in the relative levels of starting and ending points.

A second factor which contributes to the interpretation in terms of levels and even in terms of three levels derives from the preliminary nature of the analysis. It is quite likely that there are other intonational contrasts not yet perceived, although the combinations postulated include a considerable amount of language data. With a view to further possible contrasts the system of three contrasts allows for more flexibility for treatment of further evidence.

However, at this stage of analysis, neither of the two other proposed treatments can be excluded. The treatment of the next larger level of structure may show whether the treatment in terms of two levels and juncture characteristics is to be preferred over the one presented here. A treatment in terms of contours is also possible.

4.32. Pitch characteristics of pre-head elements. Parts of phonemic-phrases preceding the final phonemic-word are not without pitch differentiation. In phonemic-phrases containing a head and a sub-head element, these elements in positions other than the head of the phonemic-phrase are characterized by a noticeable rise in pitch, (along with an increase in intensity), this augmentation being noticeably greater in the case of a head phonemic-word than for a sub-head. Syllables which are the centers of phonemic-words manifesting Non-head-phonological-word-types

also show some rise in pitch. This rise is much less, however, than in the case of either a head or sub-head element.

In addition to this, contours beginning in pitch level 2 ($\hat{2}_{-1}$, $\hat{2}$) have a distinctive pitch pattern on the syllables preceding the main contour element. This pre-head pitch pattern consists of a progressive rise in pitch in the syllables preceding the head of the contour, with the actual beginning of the main contour being on a lower pitch or the same pitch as the ending pitch of this pre-head rising pitch sequence. This may be shown by examples as:

$\hat{2}_{-1}$ /nʉ́hkʰʔʌ̃ctʌ̃ʔʉ̨g/   'I'll go see'

$\hat{2}$ /vè́ʔemihê²ə/   'maybe'

As seen in previous examples, these contours also occur without the pre-contour element.

4.33. <u>Placement of intonation contrasts relative to</u> phonemic-phrases. In phonemic-phrases containing a head-phonemic-word but no non-head-phonemic-word, the significant pitch contrast occurs or begins on the syllable carrying the phrase-head stress. In phonemic-phrases containing both head and sub-head-phonemic-words, the center of the intonational contrast may be either the head or the sub-head element. This may be indicated in the transcription as follows: with the intonational contrast on the head-phonemic-word /hæ̃ʔæhi ʔʌ̃cʌ̃ŋʌ̂hcp $\hat{2}_{-1}$/ 'that's what I <u>say</u>', /hæce-ʔenâ·ydʌmê²e tyǎnʌt $\hat{3}_{-2}$/ 'that she would <u>remain alone</u>'; with the intonational contrast on the sub-head-phonemic-word /hæ̂ʔæhi ʔʌ̃cʌ̃ŋʌ̃hcp $\check{2}_{-1}$/ '<u>that's</u> what I say'.

5

Text and Analysis

In this section a short text is presented to illustrate some aspects of the description presented in the previous chapters. This text will be described primarily with reference to the variants of units of the phonotagmemic hierarchy which are manifested by the various members of the phonemic hierarchy which occur. Thus each occurring phonemic-phrase (4.1) manifests a particular variant of a phonological-phrase-type. This variant is described in terms of its emic constituents, which are phonological-word-types (4.2). Each phonemic-word (3.1) in turn manifests a particular variant of a phonological-word-type. This variant is described in terms of its emic constituents, which are syllable-types (3.2). Each occurring syllable (2.1), is a manifestation of a variant of a syllable-type. The syllable-type variant is described in terms of its emic constituents, which are phonotagmemes (2.2).

In the text, according to the transcription presented in the previous chapters, sub-script numerals serve to indicate intonational characteristics, as well as to separate between phonemic-phrases. Phonemic-words are separated by space. Syllable-division within words is almost com-

149

pletely predictable, and is therefore unmarked except for the special case mentioned in 2.111.

In order to show the degree of correlation between grammatical and phonological borders, each line of the text is also presented in a morphemic segmentation, in which morphemic words are separated by spaces. Also for every line of the text there is presented a word-for-word translation, as well as a free translation following the text. In addition, some of the more salient lexical and grammatical features of the forms are described to facilitate the comparison of phonological structure with lexical and grammatical structure. Such features included are a description of morphemic-words and their boundaries, a brief description of the emic constituents of clauses and their relationship to clause-type structure, and an indication of the internal construction of morphemic-words containing more than one morpheme, in cases in which the breakdown is not obvious from the translation and not so complicated as to make the description unwieldy.

There is a fairly large number of words in the text which are of Spanish origin. For reasons presented in 1.5, these are treated as pertaining to another system of phonemes and syllable-structure than that presented for TM phonemes proper. Although the two systems are quite distinct at the levels of phonemes and syllables, as larger units are treated there is less distinction between the two systems. That is to say, the Spanish words are fitted into TM patterns of intonation and phrase structure and to some extent to the patterns of word structure. However, it is not possible to describe the internal composition of such forms in terms of the descriptive framework developed here, since patterns of syllable structure are considerably different for the Spanish forms. In describing the text, no description will be made of the internal structure of any phonemic-words

containing phonemes not in the inventory of phonemes presented for TM in 1.1. Proper names (1.5) are also excluded.

There is a great difference between the establishment of examples to show the basic units in the descriptive framework and the interpretation of an actual body of data in terms of these units. There is quite good evidence to show that there is a contrastive difference between a particular morphemic sequence occurring in one case as just one phonemic-word and in another case as three phonemic-words, for example. This does not mean that it is equally easy to decide in any given case which of these two alternatives has occurred. Here the problems of threshold again become important. There are many places in the interpretation of the text materials where there may be room for disagreement. Refinement of phonetic analysis and perhaps of analytical procedure may help minimize this uncertainty. In a very large number of cases, a slight change in phonetic characteristics would represent a change in the phonemic grouping of the elements.

In the description of variants of the phonotagmemic units, the variants of syllable-types are the smallest units described. It is not necessary to go below this level, since the simple and expanded forms of phonotagmemes are reflected in the formulas given for the syllable-type variants of which these are emic constituents (2.22).

There are two further restrictions in the representation of syllable-type variants which occur in the text. One is that it is assumed that the representation made in 2.22 for variants of Syllable-type I provides an adequate basis for representation of other syllable-types, which were not included in 2.22. The other restriction is that we choose not to represent the distinction between C1a and C1b in the description of the text (1.3211), that is to say, the onset characteristics of phonemic-word initial and phonemic-word

medial syllables are not distinguished. Simple termini will be represented as C2, further subdivisions represented only for complex terminus variants, as C2a-C2d, etc.

5.1. Text and phonological commentary.

/tù?kpó?o?ĭt hú?n $\widehat{3}_{-2}$?ʌ·c ?òcʌn=nvĭdʌt $\widehat{3}_{-2}$ mʌ́·t =nès=/

{tú?k pó?o ?ít hú?n   ?ʌ·c ?óc nvídʌt   mʌ́·t   }

'one month ago about   we went we-wandered with'

/tè?sirĭlo $\widehat{3}_{-2}$ hæcʌkândido $\widehat{3}$ hæcsenâido $\widehat{3}$ hæc?ʌ́c hæc?ʌcʌn?ûc $\widehat{2}_{-1}$/

{té? sirĭlo   hæc kândido   hæc senáido   hæc ?ʌ́c hæc ?ʌ́c n?úc   }

'Mister Searle and Candido and Senaido and I and I my-younger-brother'

Commentary:

Intonation contours (4.3). In this first portion there are three occurrences of the contour $\widehat{3}_{-2}$, two occurrences of $\widehat{3}$, and one of $\widehat{2}_{-1}$. The three pitch-levels (marked 1-3 from low to high) (4.31) give a fairly good picture of the phonetic pitch characteristics of the phrases. However, the contour $\widehat{2}_{-1}$ has the rising pitch in the pre-head elements characteristic of this contour, so that the highest phonetic pitch occurs on the syllable preceding the central syllable of the head of the contour (4.32). These are the only contours occurring in this text. Further mention of intonation will be made only for marked differences in phonetic characteristics. All contours in the text show intonation contrast in the head word of the phonemic-phrase.

Phonemic-phrases. Each phonemic-phrase is a manifestation of some variant of a phonological-phrase-type. Each phonological-phrase-type variant has an emic constituency which is stated in terms of phonological-word-types (4.22). /tù?kpó?o?ĭt hú?n/ manifests the phonological-phrase-type variant Head--Non-head; /?ʌ·c ?òcʌn=nvĭdʌt/ manifests the variant Non-head--Head, as do also /mʌ́·t =nès= tè?sirĭlo/, and /hæc?ʌ́c hæc?ʌcʌn?ûc/. /hæcʌkândido/ and /hæcsenâido/ manifest variants of the form Head.

Phonemic-words. At the next lower level, each phonemic-word is a manifestation of a phonological-word-type variant. Each such variant has an emic constituency which is stated in terms of syllable-types as follows (3.22):

StI /hú?n, ?ʌ́·c, mʌ́·t/; StIII-StII-StI /tù?kpô?o?ʔ̃t/; StIII-StV-StI-StV /?ôcʌn=nvɪ̃dʌt/.

Syllables. Each syllable manifests a syllable-type variant. Syllable-type variants are described according to the simple and expanded variants of the phonotagmemes which are their emic constituents (2.22). Operating with the qualifications presented on p. 151, the syllable-type variants occurring in this portion of text are: C1-V?-C2 /tu?k/; C1-V?V /po?o/; C1-V-C2 /?ɪt/; C1-V?-C2 /hu?n/; C1-V·-C2 /?ʌ·c/; C1-V /?o/; C1-V-C2 /cʌn/; CN-C1-V /nvɪ/; C1-V-C2 /dʌt/.

/hæc?ʌ́·cʌnnʌ̃hks $\widehat{}_3$ hùma hæcúhstkôpk $\widehat{}_3$ hæce?e?ʌ́·c haém nhæ̂?y $\widehat{}_3$/

{hæc ?ʌ́·c nnʌ̃hks húma hæ cúhstkôpk   hæcé?e ?ʌ́·c haém nhǽ?y   }

'and we we-went where.the snow-mountain and we there we-arrived'

/hæc=?ʌ́·cʌngâ·hy $\widehat{}_{2-1}$/

{hæc ?ʌ́·c ngá·hy   }

'and we we-ate'

Commentary: variants of units in the phonotagmemic hierarchy not attested in previous part of the text.

Phonemic-phrases.   Non-head--Non-head--Head   /hæce?e?ʌ́·c haém nhæ̂?y/.

Phonemic-words. StIV-StII-StV-StI /hæc?ʌ́·cʌnnʌ̃hks/; StI-StV /húma/; StIV-StII-StI /hæcúhstkôpk/; StIV-StIV-StI /hæce?e?ʌ́·c/; StIV-StII-StV-StI /hæc=?ʌ́·cʌngâ·hy/.

Syllables.   C1-V· /?ʌ·/; C1-Vh-C2a-C2b /nʌ̃hks/; C1-V-C2a-C2b /kopk/; CN-C1-V?-C2 /nhæ?y/; C1-V·h-C2 /ga·hy/.

/van?ícè?e= sirílovyʌ̃·hny para?ʌ́·cʌnnʌ̃hksʌt hùmacũhst $\widehat{}_3$ pèro=/

{van?ícè?e sirílo vyá·hny para ?ʌ́·c nnʌ̃hksʌt húma cúhst pero}

'and-then   Searle he-said for we we-will-go where snow but'

TOTONTEPEC MIXE PHONOTAGMEMICS

/ká?acʌ?ʌ̀·cʌnnı̀hkṣ $\widehat{\ }_3$ komo?ó·y?ìttyunzûṣ $\widehat{\ }_3$ hæckà?atı̀ tı̀hàt-/

{ká?acé?e ?ʌ̀·c nnı̀hkṣ kòmo ?ó·y ?ı̀t tyunzúṣ hæc kà?atı́ tı̀háty}

'not we we-went as very it-was it-was-very-cold and nothing whatever'

/tyukpǽtup $\widehat{\ }_{2-1}$/

{tukpǽtup }

'to climb with'

Commentary: variants of units in the phonotagmemic hierarchy not attested in previous part of the text.

Phonemic-phrases. Non-head--Sub-head--Sub-head--Head /van?ı́cè?e= sirflovyǎ·hny para ?ʌ̀·cʌnnʌ̀hksʌt hùmacûhṣt/.

Phonemic-words. St IV-St I-St III /van?ı́cè?e/; St IV-St IV-St II-St V- St I-St V /para?ʌ̀·cʌnnʌ̀hksʌt/; St III-St V-St I /hùmacûhṣt/; St II-St V-St II- St V-St I /ká?acʌ?ʌ̀·cʌnnı̀hkṣ/; St IV-St IV-St II-St III-St V-St I /komo?ó·y- ?ìttyunzûṣ/; St IV-St III-St I /hæckà?atı̀/; St II-St III-St V-St I-St V /tı̀hàttyuk- pǽtup/.

/van?ìce?evyá·hny pararetràtodʌpʌ̂kʌt $\widehat{\ }_{3-2}$ hæce?ekyámera/

{van?ı́cè?e vyá·hny para retráto dʌpʌ́kʌt hæcè?e kyámera}

'and then he-said for picture he-will-take-it and his-camera'

/dʌyakpı̂cʌm $\widehat{\ }_{3-2}$ hæc?ʌ̀·cʌsnı̀hmi para?ʌ̀·cʌndæ̂nat $\widehat{\ }_{2-1}$/

{dʌyakpı́cʌm hæc ?ʌ̀·c snı̀hmi para ?ʌ̀·c ndæ̂nat }

'he-took-it out and we he-said-to-us for we we-will-stand'

Commentary: variants of units in the phonotagmemic hierarchy not attested in previous part of the text.

Phonemic-phrases. Sub-head--Head /hæc?ʌ̀·cʌsnı̀hmi para?ʌ̀·cʌndæ̂nat/.

Phonemic-words. St IV-St IV-St I-St V /dʌyakpı̂cʌm/; St IV-St III-St V- St I-St V /hæc?ʌ̀·cʌsnı̀hmi/.

154

/van?ícè?e kándidodʌyaknᵻhma $\widehat{3-2}$ kàdimìcʌmnapyʌ́mhʌ ?ʌ̀·cmʌ̂·t $\widehat{3}$/

{van?ícè?e kándido dʌyaknᵻhma   kádi míc mnapyʌ́mhʌ ?ʌ̂·c mʌ̂·t}

'and then Candido they-told-him don't, you you-join we with'

/kʌṣvindŏkiyapṣavè?e kyâmera $\widehat{3-2}$ kumíc hæ̀pʌmdânʌt $\widehat{2-1}$/

{kʌṣ vindŏkiyapṣavè?e kyámera   ku?u míc hǽp mdánʌt   }

'because really-broken his-camera when you there you-will-remain'

Commentary: variants of units in the phonotagmemic hierarchy not attested in
            previous part of the text.
    Phonemic-words.   StIV-StI-StIII /van?ícè?e/; StIII-StV-StIII-StV-
StV-StI-StV /kàdimìcʌmnapyʌ́mhʌ/; StIII-StI /?ʌ̀·cmʌ̂·t/; StIV-StIV-StI-
StV-StV-StV-StIII /kʌṣvindŏkiyapṣavè?e/; StIV-StI /kumíc/.

/van?ícè?e y?ʌ̀ṣvâ?kni $\widehat{3-2}$ nay?amâ?tp $\widehat{2-1}$ kù?uvè?e= vé?em/

{van?ícè?e y?ʌ̀ṣvâ?kni   nay?amá?tp   kù?uvè?e vé?em }

'and then he-separated-himself offended   when   really'

/yaknᵻhmi $\widehat{3-2}$ kucè?ehyò·?k-yaknᵻhmi ?ʌṣ?ô·k $\widehat{3}$ paracʌretra-/

{yaknᵻhmi   kucè?e hyò·?kyaknᵻhmi ?ʌṣ?ô·k paracé?e retra-}

'he-was-told when he-told-him-again later in-order-to take-'

/târhat $\widehat{3-2}$ kà?adʌ?ukcôhkni $\widehat{3-2}$/

{tárhat   ká?a dʌ?ukcôhkni   }

'a-picture not he-wanted-to'

TOTONTEPEC MIXE PHONOTAGMEMICS

/kʌ�igs=hyà·ncyhá?vivuvè?e hu?uyaknɨhmi $\hat{2}_{-1}$ hu?uyaktuknɨhmi $\hat{2}_{-1}$/

{kʌ́s hyà·ncyhá?vivuvè?e hú?u yaknɨhmi   hú?u yaktuknɨhmi   } .

'because he-believed   what he-was-told   what he-was-told'

Commentary: variants of units in the phonotagmemic hierarchy not attested in
         previous part of the text.
    Phonemic-words. StIII-StI-StV /y?ʌsvá?kni/; StIII-StIII-StI /kù?uvè-
?e=vé?em/; StIV-StIII-StIII-StV-StI-StV /kucè?ehyò·?kyaknɨhmi/; StIII-
StV-StV-StI-StV /kà?adʌ?ukcóhkni/; StIII-StIII-StI-StV-StV-StIII /kʌ̀s=-
hyà·ncyhá?vivuvè?e/.
    Syllables.   C1-V?-C2a-C2b /ma?tp/; C1-V·?-C2 /hyo·?k/; C1-Vh
/nɨh/; C1-Vh-C2 /cohk/.

/?às= kuc?ʌ́·c nvimpĩhtni $\hat{3}_{-2}$ hæcè?e= /

{?as ku?ucé?e ?ʌ́·c nvimpíhtni hæcé?e }

'well when we we-returned and'

/?ʌ́·c nhæ̃?y $\hat{3}$ tù?kkâhpʌn hu?udʌsʌ̂· $\hat{3}_{-2}$?omékamêka $\hat{3}_{-2}$/

{?ʌ́·c nhǽ?y tú?k káhpʌn hu?u dʌsʌ́·   ?omékamêka   }

'we arrived one town   which they-call-it Amecameca'

/hæc?ʌ́·cʌn=nʌ̌h= nɨhks $\hat{3}$ kópkʌ̌hsm $\hat{3}$ hùmakalvârio $\hat{3}$/

{hæc ?ʌ́·c nnɨhks   kópkʌ̌hsm húma kalvário }

'and we we-went   to-the-mountain-top where Calvario'

TEXT AND ANALYSIS

Commentary: variants of units in the phonotagmemic hierarchy not attested in
previous part of the text.

Phonemic-phrases. Head--Non-head /tú?kkâhpʌn hu?udʌsʌ́·/.

Phonemic-words. StIV-StII-StV-StI-StV /?omékamêka/; StII-StI /kópkʌ̂hṣm/.

Syllables. CN-C1-V?-C2 /nhæ?y/.

/hæémcè?e tʰí·v nyacyúṣhi paradʌyakretrâtarhat $\widehat{3}_{-2}$?òyam?ʌ́·-/

{hæémcè?e tʰí·v nyacyúṣhi para dʌyakretratárhat   ?oyam ?ʌ·c}

'there straight he-lined-up in order that he-will-take-a-picture a-lot we'

/cʌnhò·?kn**h**mini $\widehat{3}_{-2}$ hæc= yakvindókiyapʌ hæ= hækámera hæ=y?îṣʌn $\widehat{3}_{-2}$/

{nhò·?kn**h**mini   hæc yakvindókiyap   hæ kámera hæ y?îṣʌn   }

'we-told-him-again that would-be-broken the camera the its-lens'

/kà?acʌ?ukmʌhʌpʌ̂·mni $\widehat{3}_{-2}$ yakretratárhivavê?e $\widehat{2}_{-1}$/

{kâ?acè?e ?ukmʌhʌpʌ́·mni   yakretratárhivavè?e   }

'not he-paid-attention   he-was-photographed'

Commentary: variants of units in the phonotagmemic hierarchy not attested in
previous part of the text.

Phonemic-phrases. Non-head--Non-head--Non-head--Head /hæémcè?e
tʰí·v nyacyúṣhi paradʌyakretratârhat/.

Phonemic-words. StI-StIII /hæémcè?e/; StIII-StV-StII-StV-StIII-StI-StV-StV /?òyam?ʌ́·cʌnhò·?kn**h**mini/; StIII-StV-StV-StV-StV-StI-StV /kà?acʌ?ukmʌhʌpʌ̂·mni/.

Syllables. C1-V·?-C2 /ho·?k/.

157

TOTONTEPEC MIXE PHONOTAGMEMICS

/ʔàsvéʔemcèʔe má·y dʌpɨk ndè·ʔmsirˆlo ⌢₃ hæ= fotografía ⌢₃/

{ʔás véʔemcèʔe ma·y dʌpɨk ndèʔm sirˆlo hæ fotografía }

'well really many   he-took mister Searle the photographs'

/peromǽhcktú·hkceʔe vyindôkiva ⌢₂₋₁/

{pero mǽhcktú·hkcèʔe vyindókiva   }

'but a few   he-also-ruined'

Commentary: variants of units in the phonotagmemic hierarchy not attested in
            previous part of the text.
    Phonemic-words. StIII-StI-StIII /ʔàsvéʔemcèʔe/; StIV-StI-StV-StV
/vyindôkiva/.
    Syllables. C1-VʔV-C2 /veʔem/; CN-C1-V·ʔ-C2 /nde·ʔm/.

Free translation:
    About a month ago Mr. Searle, Candido, Senaido, my brother and I went
for a little trip. We went to the snow-capped mountain. We arrived there and
we ate. Then Searle said that we should go where the snow was; but we didn't
go since it was very cold and we didn't have anything to climb with. Then he
said that he would take a picture. He took out his camera and told us to pose.
And then we told Candido, "Don't you join us, because if you stand in there,
his camera will certainly be broken." Then he separated himself, offended.
When he was really asked again later to be photographed he didn't want to,
because he believed what he had been told. Well, when we returned, we
arrived at a town which is called Amecameca. We went to the top of a mountain
where a cross was. There we lined ourselves up so that he could take pictures.
We really told Candido again that the lens of the camera would be broken. He
paid no attention and had himself photographed. Well, Mr. Searle really took
a lot of pictures, but a few he ruined.

5.2. <u>Morphemic and grammatical commentary</u>. 5.21.
<u>The determination of morphemic-words</u>. TM morphemes or
morpheme sequences constituting morphemic-words belong
to one of two sets of forms: (1) a morpheme or sequence of
morphemes which in some of its occurrences constitutes an
entire phonemic-phrase may be a morphemic-word. This
criterion is interpreted broadly, so as to include anything
which can be easily elicited from a linguistically-naive in-
formant as an answer to the question "How do you say ____?"
Most morphemic-words fit this definition. (2) A morpheme
or morpheme sequence which does not in any of its occur-
rences constitute an entire phonemic-phrase may neverthe-
less constitute a morphemic-word if it is a constituent at a
phrase or clause level. The list of this sort of morphemic-
words is quite restricted. A very frequently occurring
example is {hæc} 'and'.

In the interpretation of the above, each morpheme in a
clause is a morphemic-word or part of a morphemic-word.
Some forms which do occur as complete phonemic-phrases in
some of their occurrences may nevertheless constitute less
than one morphemic-word in some combinations. An example
of this would be {ʔúc} 'younger sibling', which does consti-
tute a complete phonemic-phrase in some of its occurrences,
but also occurs with a person-marking prefix as in {nʔúc}
'my younger sibling'. Both {ʔúc} and {nʔúc} fulfill condi-
tion (1) above. However, the morpheme {n-} 'first person'
fulfills neither condition (1) nor (2). Only the segmentation
which considers {nʔúc} as one word makes {n-} part of a
morphemic-word. Thus a sequence which is a complete
morphemic-word may also occur as part of a morphemic-
word containing affixes as well.

Classes of morphemic-words (nouns, verbs, etc.) ex-
hibit characteristic internal structure. For instance, the
verb prefix {kʌ-} 'subjunctive', always occurs as the first

morpheme of a morphemic-word. This prefix is of infrequent
occurrence. A means of identifying beginnings of verb-forms
not containing it is the occurrence of a person-marking
prefix, which then occurs word-initially. Tense-aspect
suffixes such as {-ʌt} 'future' always are terminal to a
verb form, except for the special case of the emphatic forms
{-veʔe, -ceʔe, etc.} which may be attached to any mor-
phemic-word class. Similar formal characteristics may be
defined for every morphemic-word class.

Forms which occur as complete phonemic-phrases may
also occur as parts of compound morphemic-words. Com-
pound words contain more than one morpheme which may
constitute either a complete morphemic-word in some occur-
rences, or the head of a complete morphemic-word, but
which in the particular combination show strong indication of
patterning as a single unit of morphemic-word structure.
For example:

{kɨp spúsʌt}   'you will cut a tree'

{mgɨpʌpúsʌt}   'you will tree-cut'

In the first of the two forms, {kɨp} is a complete morphemic-
word. In the second case it is part of a compound word. In
the first example {kɨp} occurs outside of the person-
marking prefix {s-} 'second person' which marks the bound-
ary of the verb. In the second case {kɨp} occurs following
the person prefix {m-} 'second person' and preceding the
verb final suffix {-ʌt} 'definite future', thus within the
limits of the verb.

The difference between the two person prefixes in the
two illustrations is also of significance in this example. In
the first case, the form {s-} is one of a set of person
markers which occur with transitive verb forms. {kɨp} in
this case functions syntactically as an object. In the second

160

case, {m-} is a corresponding member in a set of person markers occurring with intransitive verbs. In this case, {kə́p} is part of the verb stem, and the verb form is intransitive.

Stress characteristics are prominently associated with morphemic-words. Any morpheme or morpheme sequence which fulfills (1) above (occurs as a complete phonemic-phrase), by this very fact occurs with a phrase-level stress. Moreover, there is a very high correlation between the number of phonemic-words in a sequence of speech and the number of morphemic-words. Thus, quite a few of the occurrences of any morphemic-word will be characterized by full stress or phrase stress.

However, the stress characteristics of a particular occurrence are not determined for any morphemic-word. When such a word occurs as a complete phonemic-word or when part or all of it constitutes the center of a phonemic-word, it is characterized by full or greater stress. In some other occurrences it may have less stress. The following example from the text may be taken as an example.

/hæcʔə́c hæcʔʌcʌnʔûc $\widehat{2}_{-1}$/

{hæc ʔə́c hæc ʔə́c nʔûc   }

'and I and I my-younger-sibling'

The first occurrence of {ʔə́c} 'I', as center of a phonemic-word, has full stress, the second, as part of a pre-central unstressed portion of a phonemic-word, is unstressed. This illustrates the distinctiveness described for morphemic units as against phonemic units referred to in 0.6 and 3.14.

Thus, although stress is an important characteristic of morphemic-words, it is basically a morphophonemic characteristic, and is part of the general composition of morphemic

161

units in terms of phonemic units. The differences in stress characteristics for any given morphemic-word are determined by position relative to phonemic structure. In transcribing the text in a morphemic segmentation, each morphemic-word is cited according to the loudest phonemic-word-stress accorded its various parts in all of its occurrences.

There is one other prominent difference here between units in a phonemic notation and in a morphemic notation. In the previous example, in the sequence /ʔʌcʌnʔúc/, there is a vowel symbol /ʌ/ which is not represented in the morphemic notation {ʔʌ́c nʔúc} 'I my-younger-sibling'. In the morphemic segmentation, the practice is followed of not indicating allomorphic differences which are related to the combination of morphemic-words into phonemic-words.

5.22. Description of the text. A brief description of the first few lines of the text is given as a sample of the general outline of lexical and tagmemic structure to which the phonological description is related.

{túʔk póʔo ʔít húʔn ʔʌ́·c ʔóc nvídʌt mʌ́·t téʔ sirílo hæc kándido hæc senáido hæc ʔʌ́c hæc ʔʌ́c nʔúc} 'About a month ago, we went for a little trip, (with) Mr. Searle and Candido and Senaido and I and my younger brother'. The emic constituents of this clause are interpreted as being {túʔk póʔo ʔít húʔn} 'about a month ago', a phrase functioning as a time-indicating element, {ʔʌ́·c} 'we' a subject, {ʔóc nvídʌt} 'we-went-for-a-little-trip' a predicate consisting of a verb phrase, {mʌ́·t téʔ sirílo hæc kándido hæc senáido hæc ʔʌ́c hæc ʔʌ́c nʔúc} 'with Mr. Searle and Candido and Senaido and me and my brother' a relater-phrase. Of these elements, only the predicate is obligatory to the clause-type. Phrases with {mʌ́·t} occur both with the rest of the phrase preceding or following this form. An

162

example of the reverse order is {ʔʌ́·c mʌ́·t} in {kádi míc mnapyʌ́mhʌ ʔʌ́·c mʌ́·t} 'don't you join with us'.

The only morphemically complex morphemic-words in this clause are {nvídʌt} 'we-take-a-little-trip', and {nʔúc} 'my younger sibling'. {nvídʌt} consists of {n-} 'first person subject'; {vídʌt} 'to take a little trip' is the verb root. {nʔúc} again consists of {n-} 'first person', in this case functioning as a possessive, {ʔuc} 'younger sibling'.

{hæcéʔe ʔʌ́·c haém nhǽʔy} 'and we arrived there'. {hæcéʔe} 'and' is an introducing-connector element to the rest of the clause, {ʔʌ́·c} 'we' is a pronoun occurring as the non-obligatory subject of the clause, {haém} 'there' is a non-obligatory place-indicating element, {nhǽʔy} 'I/we arrived' is a verb form occurring as the obligatory predicate element.

{hæc ʔʌ́·c ngá·hy} 'and we we-ate'. This clause consists of an introductory connector {hæc} non-obligatory to the clause-type, {ʌ́·c} 'we' a pronoun free subject also non-obligatory, and {ngá·hy} 'we-ate' a verb predicate which is obligatory to the clause-type manifested here.

The functions of {hæcéʔe} in the previous clause and {hæc} in this clause are the same. {hæcéʔe} includes an emphatic morpheme {céʔe} plus {hæc}. The main difference between the two forms is that {hæcéʔe} does occur in some instances as an entire phonemic-word, although not in this instance /hæceʔeʔʌ́·c..../.

The only other morphemic complexity of these clauses is within the verb forms {nhǽʔy} 'we-arrived' and {ngá·hy} 'we-ate'. These contain the person prefix {n-} 'first person' marked above.

{vanʔícèʔe sirílo vyá·hny para ʔʌ́·c nnʌ́hksʌt húma cúhst} 'and then Searle said that we should go to where the snow was'. {vanʔícèʔe} 'and then' is an introductory-connective, {sirílo} 'Searle' is the free subject, {vyá·hny}

163

'he said' is a verb manifesting the obligatory predicate. The
rest of the clause, {para ʔʌ̆·c nnʌ́hksʌt húma cúhṣt} is it-
self a clause and functions as a direct object in the clause
structure.   It has its internal structure, which is {para}
'for, that', one of a class of particles which introduce
clauses modifying other clauses, {ʔʌ̆·c} 'we' free subject,
{nnʌ́hksʌt} 'I/we will go' a verb manifesting the obligatory
predicate, {húma cúhṣt} 'where snow' a phrase indicating
place.

   The morphemic-word {vanʔíce̋ʔe} 'and then' includes
the emphatic affix {-ce̋ʔe}, {vyá·hny} 'he said' has the
person-prefix {y-} 'third person' which is metathesized
with the stem-initial consonant, {nnʌ́hksʌt} 'we-will-go'
consists of {n-} 'first person' {nʌ́hkṣ} 'go' {-ʌt} 'future
definite'.

   {pero káʔace̋ʔe ʔʌ̆·c nnʌ̋hks kȯmo ʔó·y ʔít tyunzús
hæc kȁʔatí tíháty tukpǽtup} 'but we didn't go, since it was
very cold and there wasn't anything to climb with'. {pero}
'but' introductory-connective, {káʔace̋ʔe} 'negative' {káʔa}
plus emphatic {ce̋ʔe}, {ʔʌ̆·c} 'we' free subject of the
clause, {nnʌ̋hkṣ} 'I/we went' verb occurring as predicate.
The rest of the stretch, {kȯmo ʔó·y ʔít tyunzús hæc kȁʔatí
tíháty tukpǽtup} is interpreted as a coordinate structure of
two clauses, the whole modifying the predicate element
{nnʌ̋hkṣ}.   Neither one of these modifying clauses, however,
has the general structure of the clauses previously described
here. {kȯmo ʔó·y ʔít tyunzús} consists of the introductory-
connective {kȯmo} 'since', {ʔó·y} 'very', {ʔít} 'it was'
(?), {tyunzús} 'it-is-very-cold'.   The grammatical struc-
ture of this clause is different from the preceding and has
not been satisfactorily described as yet.   The interpretation
of it depends to great extent upon the function of the form
{ʔít}.   In some combinations, as in {tứʔk póʔo ʔít} 'one
month ago' it indicates past time.   In other cases, as in

{tǔhpa yʌ́ʔʌvè̀ʔe yʔíht} 'he was a soldier', {ʔít} is a verb
root meaning 'to be'. The structure of the clause {ʔóꞏy ʔít
tyunzǔṣ} is commonly used with reference to weather, and
is probably an expansion of {ʔóꞏy tyunzǔṣ} 'it's very cold'.
The other clause in this construction is also not of the pat-
tern shown in previous sentences and is also problematical.
{hæc} 'and' is an introductory-connective, {kà̀ʔatí} 'noth-
ing' comprises one part of a bipartite construction with which
the rest of the clause stands in a relation which might be
called appositional. {tíhǎty tukpǽtup} 'with which to climb',
includes a verb form {tukpǽtup}, including the suffix {-up}
'indefinite future', but is not marked for person.

6

Restructure of Pike's Language

The viewpoint of language theory presented in the above description is not in complete agreement with that found in Pike's Language. Changes have been made at rather important points, centering around a change in the number of hierarchies of emic units; the additional hierarchy is the hierarchy of phonotagmemic units. Closely related to this change are a redefinition of the distribution mode of emic units and a resultant change in the application of the relationship between modes of units and hierarchies of emic units.

This chapter is an attempt to further clarify the differences between Pike's Language and the application made here. It will be mostly devoted to an attempt to show that the rejection by Pike of the interpretation made here of hierarchical structure is based on some inconsistencies in Pike's Language itself.

6.1. The phonotagmeme. The most fruitful aspect of Pike's linguistic model to date has been the slot-class correlate, the tagmeme, as applied in studies of lexico-grammatical materials. The tagmeme has been useful as a unit of description for grammatical systems, but perhaps even more

importantly as an instrument in analytical procedure. As pointed out in the introduction, one of the major considerations of the study presented here has been the application of this same procedural principle to the area of phonology. Moreover, the phonotagmeme has been postulated as an emic unit, and as the basic unit of a whole hierarchy of linguistic units, the phonotagmemic hierarchy. Pike does not set up such a hierarchy.

This is not to say, however, that he does not attach any importance to the slot-class correlate in phonology. Concerning this he says:

> Since we have been dealing with the classes of phonemes, and with slots within which these classes are distributed, and since the classes in part define the slots and the slots in part define the classes, we next inquire: Should we postulate an emic unit comprised of a correlation between an emic phonological or grammatical shape-type slot and an emic phonological class, as we did earlier between a tagmemic slot and a morphemic class (i.e., the tagmeme, Chapter 7)?[1]
>
> Our answer is in the affirmative: A structural correlation between an emic class of phonemes and an emic slot in the shape type of some phonological or grammatical unit must itself constitute a kind of emic unit. The "C" (or the "V") in the CVC formula of an emic syllable type, or in the formula of a morpheme shape type, etc., is the symbolization of a PHONEMIC SLOT-CLASS CORRELATIVE. It differs from the tagmeme, which is a morphemic slot-class correlative,

[1] Between the writing of Pike's Language and the present writing, there have been three important changes in terminology in Pike's own description of his materials. What is here labelled tagmeme was in Language labelled grameme. Pike's former term uttereme has been replaced by syntagmeme. The former spot has been supplanted by slot. These changes have reflected no change in the use of the concepts concerned. I have taken the liberty, in quoting Pike's Language, to replace these three terms by their more modern forms. The quotes from Language are made in terms of tagmemes, syntagmemes, and slots.

(1) in that its manifesting elements are members of classes of phonemes, rather than classes of morphemes, and (2) in that it is not a minimum unit of any mode of the syntagmeme, but is a unit in the phonological hierarchical system of the manifestation mode of the syntagmeme, whereas the tagmeme must be set up as the minimum unit of the distribution mode of the syntagmeme, for reasons discussed in Chapter 7. (Pike Language 8.66)

Thus, the difference between the interpretation given to the phonological slot-class correlations in this study and that made by Pike is mainly in reference to the position of such units in the total system; there is no question concerning the relevance of slot-class correlations in the area of phonology. Apart from the difference given the units of this type in the total structure, however, there are some differences in the extent to which the tagmeme principle is applied to phonological analysis. The slot-class correlate is applied in this analysis in certain areas where it is not in the descriptions made in Language. This is shown by the distinction at every level in this discussion between phonotagmemic and phonemic units, and also the view of syllable-types as more than just "CV shape-types".

In the above quotation from Pike, there are two differences stated between the slot-class correlates of phonological units and those of lexical units. The first of these is that the phonological unit has as its filler component a class of phonological units, not of morphemic units. In this there does not seem to be any causal significance. The only possible such interpretation would be that the phonological slot-class correlate is less important to language than the lexical slot-class correlate just as the phoneme is less important than the morpheme. Regardless of the validity or invalidity of such a statement, it is no more reason to reject

the phonotagmeme as an emic unit than it is reason for re-jecting the phoneme as an emic unit.

The second difference seems to be the primary reason for considering the tagmeme as an emic unit and hierarchy, while not giving such status to the phonotagmeme. This reason is that the tagmeme constitutes the minimum unit of one mode of the syntagmeme, the distribution mode. The phonotagmeme does not constitute the minimum unit of any mode of the syntagmeme, but rather for Pike phonological slot-class correlations are relevant only within the phonological hierarchy. Thus the positing of the tagmeme as an emic unit is closely dependent upon its relationship to the total picture of hierarchical structure. The further positing of the phonotagmemic hierarchy of units involves a change in the total hierarchical arrangement. The proposed change should therefore be presented in connection with an examination of the criteria involved in setting up the three hierarchies in Pike's model.

Now, according to the above quote from Pike, "the tag-meme must be set up as the minimum unit of the distribution mode of the syntagmeme, for reasons discussed in Chapter 7". However, what is included in Chapter 7 is not a set of reasons for setting up the tagmeme as an emic unit. The chapter begins with the definition of tagmeme-like units in general behavior and in language, so that the tagmeme is defined as the minimum unit of the distribution mode of the syntagmeme. The chapter describes such units, but makes no definition of criteria for the establishment of the unit other than that of the definition given above.

In earlier chapters of Language there are passages which outline the general nature of hierarchical structure. These are of the same sort as the description in Chapter 7 (Pike Language 3.5); the tagmeme, and the other basic units

169

and hierarchies set up, are not set up as deduced units, but as postulated units in the system of language structure.

This is not to say that there is no place in such a system for postulated units. They are necessary. We must postulate phonemes in order to do any phonemic analysis, for instance. However, it is somewhat misleading to say that the description of the postulated tagmeme in Chapter 7 constitutes a reason for setting it up as an emic unit and not setting up the phonotagmeme as a similar unit. This is no more than to say that the tagmeme is a postulated unit because it has been postulated, whereas the phonotagmeme is not postulated as an emic unit.

In this proposed restructure of Pike's hierarchical structure there are also postulated units. Rather than the three hierarchies of emic units, four are postulated. Of course, the validity of these changes and the resultant total view of language cannot be proven true any more than can Pike's system. They can only be subjected to the test of applicability to actual language data--and within the spirit of Pike's approach, ultimately to cultural behavior outside of language proper--and to the test of internal consistency as a system.

6.2. Pike's definition of hierarchies. It is the purpose of this section to show that the postulation of the three hierarchies in Pike's Language as presented in these chapters is not consistent with his total view of language as presented in the rest of Language and as reflected in other applications of the tagmemic approach. Since the argument against the phonotagmemic hierarchy is that it does not occupy a position in the total hierarchical structure, the finding of inconsistency in the establishment of the modal theory would do quite a bit toward the discrediting of this objection to the phonotagmemic hierarchy.

In Chapters 6, 7, and 8--as a further development of an outline of structure introduced in Chapter 5--the basis of Pike's modal-hierarchical structure is set up by definition in terms of three hierarchies of units, each hierarchy constituting one mode of the syntagmeme, the verbal behavioreme. This arrangement accounts for the titles of the three chapters. The minimum unit of the feature mode of a syntagmeme is the morpheme (Chapter 6), and the feature mode of the syntagmeme is composed of lexical (morphemic) units--simple morphemes and larger hypermorphemic units. The minimum unit of the manifestation mode of the syntagmeme is the phoneme (Chapter 8), and the manifestation mode of the syntagmeme is composed of phonological units--simple phonemes and larger hyperphonemic units. The minimum unit of the distribution mode of the syntagmeme is the tagmeme (Chapter 7), and the distribution mode of the syntagmeme is composed of tagmemic units--simple tagmemes and larger hyper-tagmemic units.

The tagmeme is a slot-class correlate unit. It is comprised of an emically significant slot plus a class of items (lexical or morphemic) which constitutes the filler of that slot. It is important to distinguish: (1) the tagmeme as a unit, (2) the slot aspect of the tagmeme, (3) the lexical units which individually constitute manifestations of the tagmeme, and (4) the class of lexical units which constitutes one aspect of the feature mode of the tagmeme. It is the slot versus class distinction which makes the tagmeme a useful unit. It allows a distinction to be made between a subject tagmeme unit and an object tagmeme unit in a given language, for instance, even though the emic class of fillers (nouns?) be essentially the same for both tagmeme units. In tagmemic analysis, considerable care is taken to distinguish between the tagmeme as a unit and the lexical classes which occur as fillers of the tagmemes.

171

It is precisely this type of distinction which is not made very clearly in the definitions of "modal structure" in Chapters 6, 7, and 8. It seems as though in the definition of the feature and manifestation modes of the syntagmeme as presented there, the syntagmeme is being treated as a filler-type unit, an element in the lexical hierarchy, or perhaps as a class of lexical elements. The definition of the distribution mode, however, and also to great extent, all the modal descriptions, once the basic definitions have been made-- that is in applications outside of Chapters 6, 7, and 8, seem to treat the syntagmeme as a tagmeme-like unit.

6.21. The feature mode. Of basic importance in the postulated system of modes and hierarchies in Pike is the preliminary definition of the behavior unit--the behavioreme, (whose linguistic parallel is the syntagmeme).

> As a first approximation of the meaning of the term behavioreme, we suggest that it be used to label an emic unit of top-focus behavior which is related to its cultural matrix in such a way that cultural documentation may be found for its beginning, ending, and purposive elements. (Pike Language 5.1)

The important terms here are "focus" and "purpose". Further:

> The threshold for minimum behavioremes must not be allowed to go lower, for any one hierarchical set, than can be culturally, objectively, documented as having closure, and as being purposive. In spite of the fact we have earlier shown that there is an area of indeterminacy in the matters of participant type, and so on, the insistence on such a threshold, indeterminate as it may be, is essential to a useful, practical handling of the theory; ... Nevertheless ... the determination of a threshold of minimum behavioremes

172

is important. It is this threshold which allows us, in the present volume, to stop short of the <u>redutio</u> <u>ad</u> <u>absurdam</u> of treating the movement of some molecule...as constituting a behavioreme on a theoretical par with the football game...

It is the setting up of such a threshold, also, which serves as the practical base for the establishing, in the next three chapters, of minimum units of the three modes of a behavioreme. Without a minimum threshold for the size of behavioremes, there could be no "minimum" units within them. Since our minimum for a behavioreme is tied, in this theory, to the presence of purpose, and closure reflecting that purpose, the minimum unit of the feature mode of the behavioreme can be set at a threshold level which is also tied to purpose or meaning in some way...Once this is done, the minimum unit of the manifestation mode can in turn be set as in direct relation to and dependence upon the minimum unit of the feature mode of the behavioreme. (Pike <u>Language</u> 5.3)

Thus the feature mode of the behavioreme, taken as comprised in purpose, is interpreted in verbal behavioremes as being concerned with meaningful or purposive elements. This is further interpreted to be units in the lexical hier-archy, the minimum such unit being the morpheme. This then is reflected in the basic definition of the feature mode of behavioremic units:

The feature mode of an emic unit of activity will in general be viewed as comprised of simultaneously occurring identificational-contrastive components, with its internal segmentation analyzed with special reference to stimulus-response features, (including purpose or lexical meaning, where relevant). (Pike <u>Language</u> 3.5)

There is a more general definition of the feature mode,

however. This has been stated above in the introduction in terms of the characteristics which identify each emic unit and distinguish it from all other units of the same order and from other orders of emic units. Pike, defining the term "hyperphoneme" uses a similar statement:

> Each hyperphoneme, like every other emic segment, is an active, tri-modally structured emic segment of activity; it contains physical features identifying it relative to and in contrast with other emic units on its own and/or on other levels of the phonological hierarchy. (Pike Language 9.1)

To reinterpret this definition for the syntagmeme, the feature mode of the syntagmeme would consist in the characteristics which identify such units as units and which contrast each such unit with units of other linguistic levels as well as with other syntagmemes.

Two illustrations taken from Language serve to show that the interpretation of the feature mode of the syntagmeme is not made in accordance with the definition quoted above from Pike, and that by definition in practice, the feature mode of the syntagmeme is not composed of lexical units, as the definition given in Chapter 6 states. Even within Language, the morpheme is not always treated as the minimum unit of the feature mode of the syntagmeme.

> The call Mommie Mommie! is a free variant of the calling emic utterance (syntagmeme) which includes among its members, also, Daddy Daddy! since the general pattern of the syntagmeme is unchanged by the choice of the particular member of the distribution class which may fill that slot. (Pike Language 5.55)

> ...in the English syntagmeme of 'command', the variant Come! is comprised of the single morpheme come; yet the same verbal behavioreme--the same syntagmeme--could be

174

> manifested by different morphemes as in Run! or Jump! in
> which the meaning in the feature mode of the syntagmeme
> (i.e., the meaning of 'command') is unchanged, while the
> morphemes with their meanings are replaced. (Pike Lan-
> guage 6.3)

By way of emphasis, note in the above quotations that, in the
first example, different lexical items constitute free variants
of one and the same syntagmeme. In the second example,
changes in lexical meaning do not affect the meaning of the
feature mode of the syntagmeme. If then, the lexical content
of a syntagmeme can vary without affecting its feature mode--
how is the feature mode composed of lexical units? The
answer given by this writer is that the feature mode of the
syntagmeme consists not in lexical units, but in its compo-
sition of lower layer tagmemic units.

In the definition of the basic modes and minimum units
Pike seems to be considering behavioremes and syntagmemes
as individual purposive acts--lexical or motifemic units.
However, in the total theory, that is to say in almost all
other parts of the book, the syntagmeme is treated as a
tagmeme-like unit. There are also some portions in which
the reference seems to be mixed or it is not easy to distin-
guish whether the units are being regarded as tagmeme-like
or lexical in nature.

This distinction between lexical filler units and tag-
meme-like units in sentence length materials may be seen
quite clearly in the discussion of hypermorphemes in Lan-
guage Chapter 10.

> The morpheme fills a tagmemic slot, manifesting a tag-
> meme, but it is not itself that tagmeme which it manifests. A
> HYPERMORPHEME is a multimorphemic manifestation of an
> expanded tagmeme, or of a hypertagmeme, i.e., it is any
> morphemically-complex manifested variant of a tagmeme or

hypertagmeme, or of a syntagmeme or hypersyntagmeme,...
(Pike Language 10.1)

Hypermorphemes which are higher-layered than the
short phrase, furthermore, may make advantageous the use
of further labels...SENTENCE(a term useful for application
to a specific occurrence or manifestation of a syntagmeme).

Since some of the same terms...may be employed here
as were used in listing etic utterance types in 5.53-54,
however, it is important that the reader notice the crucial
difference between the two usages. In Chapter 5 we were
discussing the type. Here we are discussing any one speci-
fic member which manifests the type; that is, John came
home and Bill came home are manifestations of the same syn-
tagmeme, but are distinct hypermorphemes. Each sequence
of two or more morphemes is a separate hypermorpheme even
though they may be members of the same hypermorphemic
class and manifest the same syntagmeme. Each morphemi-
cally-distinct manifestation of a syntagmeme, or hyper-
syntagmeme, or expanded tagmeme, or hypertagmeme, con-
stitutes a separate hypermorpheme. (Pike Language 10.1)

Here the syntagmeme is very clearly presented as a tagmemic
unit. Changes in the occurring sequences of morphemes
within a syntagmeme do not affect the identification nor con-
trastiveness of the syntagmeme unit. In summary, then, the
syntagmeme is a higher level unit in the tagmeme hierarchy.
The different sentences which occur as manifestations of
these syntagmemes are higher level lexical units, hyper-
morphemes.

Moreover, there are some striking resemblances be-
tween the feature mode of the syntagmeme as defined in
Chapter 6 and the feature mode of hypermorpheme units in
Chapter 10. The feature mode of hypermorphemes is defined
in conformance with the general definition of the feature
mode given above on page 173 and with Pike's definition of
the feature mode of hyperphonemes.

> A hypermorpheme has as components of its feature mode, the formal and semantic characteristics which make it con-trast with other hypermorphemes or with morphemes, phonemes, syntagmemes, etc., and which permit its recognition or identification...
>
> As to its formal characteristics, the feature mode of a hypermorpheme is in part comprised of a specific sequence of two or more specific morphemes...

The formal aspect of the feature mode of hypermorphemes is constituted primarily in sequences of lower level units in the lexical hierarchy. It also has a phonological aspect, however. This correlates with the premise that the units under discussion as syntagmemes in Chapter 6 (and 8) are hypermorphemic units, sentences, not syntagmemes, and that the lexical composition of the units refer to the feature mode of these hypermorphemic sentence units.

Now if the feature mode of the syntagmeme does not consist in the lexical hierarchy, wherein is it constituted? In this restructure, it is presented as composed of lower level tagmemic units, as well as in the tagmemic characteristics of the syntagmeme as a unit at the sentence level. There are two reasons for doing this. The first is that it presents the syntagmeme as a higher layered unit of the nature of the tag-meme in a manner parallel to the description of the hyper-phonemic and hypermorphemic units in <u>Language</u> Chapters 9 and 10. Higher level units in the phonemic hierarchy are composed of lower level phonemic units; higher level morphemic units are composed of lower level morphemic units; higher level units in the tagmemic (grammatical) hierarchy are composed of lower level units.

The second reason for describing the feature mode of the syntagmeme in terms of smaller tagmemic units is taken from what we can call here common usage. By this we mean the practice reflected in the applications of tagmemics to

actual languages, in common usage of the terminology of tag-
memics among various fellow workers in the Summer Institute
of Linguistics.   For syntagmemes are almost without excep-
tion identified and contrasted in terms of the tagmemes of
which they are composed.   Examples may be seen in IJAL,
Vol. 23, July 1957.

6.22. The manifestation mode. If the feature mode of
the syntagmeme is not constituted in terms of units of the
lexical hierarchy, neither is the manifestation mode of that
unit constituted in terms of phonological units.   Rather the
interpretation of the syntagmeme as a unit in the tagmemic
hierarchy means that its manifestation mode should be con-
sidered in terms of units of the lexical hierarchy, since tag-
memes are manifested by lexical units, (Pike Language 7.4).
Moreover, the treatment of the phonological hierarchy as
constituting the manifestation mode of sentence-length units
makes sense if the units concerned are sentences, or hyper-
morphemic units.   Thus the manifestation mode of lexical
units is composed of the phonological sequences which mani-
fest the lexical units.   Sequences of phonemes manifest mor-
phemes.   Morphemes or sequences of morphemes manifest
tagmemic units.

6.23. The distribution mode. The preceding paragraphs
have shown that in the definitions of the basic units of the
feature and manifestation modes of the syntagmeme, the unit
in terms of which the definitions were made was a lexical
unit, a hypermorpheme.   However, in defining the basic unit
and the hierarchical structure of the distribution mode, the
syntagmeme is not looked at as a hypermorpheme, but rather
as a higher level tagmeme unit.   The distribution mode of the
syntagmeme, as described in Chapter 7, is concerned with
the tagmemic composition of the syntagmeme.

However, in spite of the fact that the distribution mode

is defined in reference to the syntagmeme as a tagmemic unit, and thence in conformance with the overall view of the syntagmeme shown elsewhere in the book, the distribution mode is also redefined in this restructure of Pike. Moreover, the alteration is more basic than that of the minimum units of the feature and manifestation modes of the syntagmeme. In those cases, the definitions of the minimum units of these modes for the syntagmeme, and only for the syntagmeme, are altered to give better consistency with the modal structure of other units. In the case of the distribution mode, the alteration is a redefinition of the basic meaning of the distribution mode for all units.

In Language, the distribution mode contains two main subdivisions. The first of these has to do with the occurrence of the emic unit as a unit, which, as a member of an emic class of units, occurs in structured slots in larger units. This aspect of distribution is labelled here "external" distribution. The second major aspect of distribution may be termed "internal" distribution and consists in the occurrence of lower level units within an emic unit. This internal distribution is considered by Pike as a distribution of slot-class correlations.

In the restructure, the distribution mode is redefined to include only the aspect of external distribution. One advantage of this change is that it presents a more normal view of distribution than Pike's inclusion of internal distribution also as part of the distributional structure of the unit--that is, if anything in linguistics may be called normal. A more basic reason for the redefinition, however, is derived from the change in the feature mode described above. If, as argued, the internal tagmemic structure of the syntagmeme is considered to be part of the feature mode of the syntagmeme, it is both redundant and confusing to consider this tagmemic structure as part of the distribution mode of the

179

same unit also. By restricting the distribution mode to include only external distribution, this redundancy is avoided. The distribution mode of the syntagmeme then is restricted to its occurrence in larger tagmemic units.

Further support for the redefinition comes from considerations of the internal distribution of the units of the various hierarchies of Pike's language structure and the alterations introduced by the phonotagmeme. In Pike's definition of the distribution mode of the morpheme, and of the hypermorpheme, the internal distribution is described in terms of phonological characteristics (Pike Language 10.4, 6.64). There is no consideration of internal lexical or tagmemic structure as part of the distribution mode of hypermorphemic units. Lexical sub-structure, rather, is related to the feature mode of these units. Tagmemic sub-structure of hypermorphemes is not mentioned by Pike in Chapter 10.

In Pike's phonological hierarchy, there is reference to internal distribution of smaller phonological units as part of the distribution mode of higher level phonological units. With the introduction of the phonotagmeme, however, this structure is interpreted in a manner more parallel to that which exists in the area of lexico-grammatical hierarchical structure. Even as it becomes unfruitful to consider the lexical units as having an internal distribution aspect in terms of smaller lexical units or of tagmemic units, so it becomes likewise unfruitful to consider the phonological hyperunits, the hyperphonemes, as having an internal distribution in terms of smaller phonological units or of phonotagmeme units. Internal structuring in slot-class correlates is considered as characteristic only of tagmemic units. The composition of a syllable in terms of phonemes is one of the principle components of its feature mode, in a manner parallel to that in which the morphemes comprising a hypermorpheme are relevant to its feature mode. The internal

slot-class structure of syllable-length units is a charac-
teristic of the syllable-type, the phonotagmemic unit.   Thus
in both the areas of lexico-grammatical and of phonological
structure,   the   consideration   of   the   internal   slot-class
characteristics of units is relevant only in units of a tag-
memic nature.   As stated previously, in the restructure,
this internal tagmemic structure is considered as part of the
feature mode of the larger tagmemic units.   The structure of
the larger units of all hierarchies is thus parallel, in that a
major component of the feature mode of any higher level unit
in any hierarchy is its composition made up of smaller units
of the same hierarchy.

The internal distribution of phonological units in lexical
units also is similarly reinterpreted.   The internal composi-
tion of a morpheme in terms of a sequence of phonemes is a
good share of what distinguishes it as a particular morpheme;
this is to say, it is part of its feature mode.   The slot-class
phonological structure of morphemes, however, is in the
area of the description of morpheme-types.   This shows the
bipartite distribution of phonological units, both in larger
phonological units and also in lexical units.   This is men-
tioned above in 1.4, and may also be labelled morpho-
phonemics.

6.3. <u>Modes and hierarchies</u>.   The postulation of three
hierarchies of emic units and three modes for each unit are
very closely interrelated in Pike's <u>Language</u>.   The definition
of the modal structure in his Chapter 3 contains a definition
of these modes in terms of hierarchies of units.

> (1) The <u>feature</u> <u>mode</u> of an emic unit of activity will in
> general be viewed as comprised of simultaneously occur-
> ring identificational-contrastive components, with its
> internal segmentation analyzed with special reference to

stimulus-response features (including purpose or lexical meaning, where relevant).

(2) The <u>manifestation</u> <u>mode</u> of an emic unit of activity will often be viewed as comprised of nonsimultaneously occurring physical variants (or nonsimultaneous components), with its internal segmentation analyzed with special reference to the hierarchy of the mechanisms of its physical production.

(3) The <u>distribution</u> <u>mode</u> of an emic unit of activity will be seen as comprised of relational components, including its class membership and its slot function, with its internal segmentation analyzed in reference to its slot distribution...(3.4, 3.6a)

This close relationship between modes and hierarchies is reflected in the modal structure of the syntagmeme. The feature mode of the syntagmeme is constituted, by definition, in units of the lexical hierarchy, the manifestation mode in units of the phonological hierarchy, the distribution mode in units of the tagmemic hierarchy. It can readily be seen that the definition of the distribution mode, in this equating of modes and hierarchies, must include aspects of distinguishing features, since the distribution mode of the syntagmeme as described by Pike is its composition in terms of tagmemic units.

In the restructure, the number of hierarchies has been altered, to permit the inclusion of a hierarchy of phonotagmemic units. Along with this, however, there has not been a corresponding change in the number of modes of emic units. The close relationship between modes and hierarchies as seen in Pike has not been carried over. Instead of basing the modal-hierarchical structure on the minimum units of the syntagmeme, as in Pike, the three modes are defined in general terms for all units, but without specific reference to hierarchies of units as such. These definitions, as they are

applied, for the feature and manifestation modes, are largely
the same as in Pike. The feature mode of a unit has to do
with its identificational-contrastive characteristics; the
manifestation mode with its various actualizations. The
distribution mode is redefined as above in 6.23.

6.4. Outline of restructure. In the preceding para-
graphs, the modal-hierarchical structure of Pike's Lan-
guage has been discussed mainly from the point of view of its
relevance to the phonotagmeme presented in this description
of TM phonology. It has been shown that the reasons shown
in Language Chapter 7 are not sufficient for the exclusion of
the phonological tagmeme as an emic unit and hierarchy. In
the discussion, reinterpretations of the several points of the
hierarchical structure have been indicated.

Of course, the rejection of the criteria on which a hier-
archy of phonotagmemic units was not included in Pike's
model does not constitute evidence for the inclusion of the
unit. This evidence comes from two sources, the position of
the unit posited in a total restructured system, and the ap-
plicability of the unit and system to empirical data. The case
for the second of these rests for the moment on the above
description of TM phonology. For the other, a short sum-
mary of the hierarchical and modal structure is given here.

The adding of a fourth hierarchy may seem like adding
complexity to an already too complex system. However, the
system of four hierarchies is in some respects more simple
than the system of three. The four hierarchies constitute a
doubly bipartite system. There are two hierarchies of seg-
ment units, the phonemic and lexical (morphemic) hierarchies,
and two hierarchies of tagmeme units, the tagmemic (gram-
matical) and phonotagmemic hierarchies. Thus the basic
division in language structure is between the lexical hier-
archy and its parallel tagmemic hierarchy on the one hand,

183

and the phonemic hierarchy and its parallel phonotagmemic hierarchy on the other. The basic division is between a lexico-grammatical area and a phonological area. This binary division is more fundamental than the distinction between segment units and tagmeme units in the two major areas.

A major source of evidence for the trimodal-hierarchical structure set up by Pike has not been considered here. This is the evidence from the noncoincidence of borders of units of the various hierarchies, so that the units of no two hierarchies are completely coincident in their boundaries. This is evidence for the separation of the hierarchies. This evidence is to be discussed in Chapter 15 of Language. Phonological units are not always coterminous with lexical and grammatical ones. This was discussed above in 0.6. Moreover, there are differences in boundaries even between lexical and grammatical units. To date, the lack of coterminousness between units of the phonemic and phonotagmemic hierarchies has not been investigated. This is not to say that such might not be found.

Such characteristics are found between the lexical and tagmemic hierarchies only in certain quite restricted marginal areas, such as special fused forms, portmanteau morphs. While not denying the importance of this sort of evidence, one factor may be pointed out regarding it as evidence for the separation of hierarchies. There is a considerable difference in degree in the lack of coterminousness as between phonological materials and lexico-grammatical materials on the one hand, and between lexical and grammatical on the other. Examples of the former are abundant-- in TM at least--and readily perceptible at most any level of analysis of phonological materials. Differences of the second type are not readily observed in TM grammatical structure.

Although considerable mention has been made in the

foregoing paragraphs to the restructured version of Pike presented in this study, the resultant structure is presented here in outline, so that the various changes may be summarized and the resultant system seen as a coherent total. The modal structure of minimum and nonminimum units of the four hierarchies will be described in outline.

6.41. The phonemic hierarchy. The lowest level unit of the phonemic hierarchy is the phoneme; larger TM units are syllables, phonemic-words, and phonemic-phrases. The feature mode of the phoneme consists in identificational-contrastive phonetic features. The manifestation mode of the phoneme consists in the variant occurrences of the unit--the various phones which constitute occurrences of the unit. The distribution mode of the phoneme consists in the occurrence of the phoneme in larger units, both lexical units and larger units in the phonemic hierarchy, and, as a member of a class of phonemes, as the manifestation of a phonological tagmeme unit.

The feature mode of larger units in the phonemic hierarchy consists also in phonetic identificational-contrastive features, as in the case of the phoneme. There is an additional factor, in that higher level units are composed of structured sequences of lower level phonemic units. Syllables are comprised of sequences of phonemes, phonemic-words are comprised of sequences of syllables. The manifestation mode of a larger phonemic unit consists in the various nonphonemic variants which comprise the occurrences of the unit. The distribution mode consists of the occurrence of the unit in larger units of the phonemic-hierarchy and in units of the lexical hierarchy. Larger phonemic units, like phonemes, also are members of classes of such units which occurring manifest higher level units in the phonotagmemic hierarchy.

185

6.42. The lexical hierarchy. The minimum unit of the lexical hierarchy is the morpheme; nonminimum units are hypermorphemes. The feature mode of the morpheme consists, in its formal aspect, in structured sequences of phonemes. Sociocultural response, or meaning, is also relevant to its feature mode. The manifestation mode of the morpheme consists in the various phonological sequences which constitute noncontrastive variant occurrences of the morpheme. The distribution mode of the morpheme consists in the occurrence of the morpheme in larger hypermorphemic units, and, as a member of a class of morphemes, as a manifestation of a tagmeme unit.

Hypermorphemes are nonminimum units of the lexical hierarchy. As in the phonological hierarchy, several significant layerings of these are distinguished in most languages. The feature mode of a hypermorpheme consists, in its formal aspect, in a composition in terms of smaller units of the lexical hierarchy, as well as in certain characteristics of a phonological nature. Again as in the case of the morpheme there is a meaning component in the feature mode of the hypermorpheme. The manifestation mode of the hypermorpheme, like that of the morpheme, consists in the various phonological sequences which constitute noncontrastive variants of the lexical unit involved. The distribution mode of a hypermorpheme consists in the occurrence of the hypermorpheme in still larger units in the lexical hierarchy, that is in still larger hypermorphemes, and also, as a member of a class of hypermorphemes, as an occurring manifestation of a hypertagmemic unit.

6.43. The tagmemic hierarchy. The minimum unit of the tagmemic hierarchy is the tagmeme; nonminimum units are hypertagmemes. The feature mode of the tagmeme consists in its formal aspect of two components. One of these is an

emic slot or positional relationship. The other is a class of
items whose members fill the slot in question, constituting
occurrences of the tagmeme unit. The meaningful relation of
tagmemes also is relevant to their feature mode. The mani-
festation mode of the tagmeme is comprised in the various
occurrences of lexical items which comprise the filler com-
ponent of the tagmeme. The distribution mode of the tagmeme
consists in the occurrence of the tagmeme in larger hyper-
tagmemes.

Hypertagmemes are higher level units in the tagmemic
hierarchy. This is somewhat of a departure from Pike in the
definition of hypertagmemes.[2] The feature mode of hyper-
tagmemes consists in the slot-class components of the hyper-
tagmeme as a unit. That is, there is a sense in which the
hypertagmeme, as a functional unit, consists of an emic slot,
and a class of filler elements. Also, however, the internal
composition of the hypertagmeme in terms of smaller con-
stituent tagmemes is part of its feature mode, in the same
sense as such composition of hyperphonemic and hyper-
morphemic units in terms of smaller units in the same hier-
archy is part of their feature modes. The manifestation mode
of the hypertagmeme consists in the hypermorphemic units
which, as occurring members of the class of hypermorphemes
which constitutes part of the feature mode of said tagmeme,
constitute occurrences of the hypertagmeme. The distribu-
tion mode of the hypertagmeme deals only with its occurrence
in still larger hypertagmemic units.

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[2] The consideration of hypertagmemes as higher level units in the
tagmemic hierarchy was first promoted by Robert E. Longacre in various
unpublished materials. It also is to be seen in Velma B. Pickett, The
Grammatical Hierarchy of Isthmus Zapotec, University of Michigan Dis-
sertations, 1959, and Ben F. Elson, Beginning Morphology-Syntax,
second edition, Glendale, California: The Summer Institute of Linguis-
tics, 1959.

6.44. The phonotagmemic hierarchy. The lowest level
unit of the phonotagmemic hierarchy is the phonotagmeme.
Larger units in this description are given specific names--
syllable-type, phonological-word-type, phonological-phrase-
type. (They could be called hyperphonotagmemes.) The
feature mode of the phonotagmeme consists in an emic slot in
syllable-structure plus a class of phonemes and phoneme
clusters which constitute the filler component of the slot.
The manifestation mode consists in the various occurrences
of the members of the filler class component of the phono-
tagmeme. The distribution mode consists in the occurrence
of the phonotagmeme in patterned relationships in larger
phonotagmemic units, namely in syllable-types.

Higher level units in the phonotagmemic hierarchy have
a similar modal structure. Each level of phonotagmemic
units has a feature mode including slots in the next higher
level of phonotagmemic structure and classes of filler items,
which are composed of units in the phonemic hierarchy, and
a distribution in larger units.

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The entries in this bibliography are limited to three areas: (1) applications of Pike's model, (2) sources explicitly mentioned in the description, (3) publications in phonology since the publication of Pike's Language which bear on this description of TM phonology. The second two categories are combined as one in the listing. Publications in tagmemics are listed separately.

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