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TABLE OF CONTENTS

1. Introduction

1.1. The thesis: previous classifications of the Mixtecan languages. In this study the thesis is propounded that Mixtec, Cuicatec, Trique and Amuzgo form a well-defined linguistic stock; the first three languages are compared in detail in an attempt to reconstruct some of the phonological and grammatical characteristics of that stock. Amuzgo has not been systematically included in this study for lack of adequate data relative to that language. However, reference to Amuzgo is occasionally made in the course of the following chapters and a few Amuzgo forms that are presumably cognate are included in the array of cognates.

Previous classifications have for some time recognized that Mixtec, Cuicatec and Amuzgo were genetically related, but there has been less certainty regarding the affinities of Trique. Since the abandonment of the Mixtec-Zapotec grouping so generally assumed by early Mexican investigators (Orozco y Berra,[1] Pimentel[2] and Cubas[3]), Trique has been usually assigned, not to the Mixtec 'family' or 'sub-stock' but to Popolocan or Otomanguean (i.e. with closest affinities to Popoloca, Chocho, Izcatec and Mazatec; cf. Lehmann[4]). The excellent Linguistic map prepared by M. de Mendizabal and J. Moreno[5] (in consultation with Robert Weitlaner) likewise assigns Trique to the Popolocan family but with some hesitation. This map has, in my opinion, the virtue of recognizing the priority of Mixtecan-Popolocan affinities over more distant relationships by combining these two families into an Olmecan branch of the Olmecan-Otomanguean stock. Mason,[6] equally in doubt as to the precise placement of Trique in regard to related languages, sets up Triquean (along with Otomian and Popolocan) as sub-stocks of the Otomanguean stock and Mixtecan as a coordinate stock; his grouping does not recognize a priority of Mixtecan-Popolocan affinities as does that of de Mendizabal and Moreno. Mason's comment regarding the languages of the Mixtec stock merits quotation: "The three languages, Mixtec, Cuicatec and Amuzgo have always been bracketed in a Mixtecan group accepted by most authorities, but apparently they differ very greatly, so much that Rivet accords each an independent position. The apparent degree of difference probably entitles each to a rating as a family, although apparently

only one language is concerned in each..."[7] Sapir's grouping[8] of Mixtec, Amuzgo, Zapotec and Cuicatec into Mixtec-Zapotec reflects at once the persistency of the old assumption of Mixtec-Zapotec affinities, and the recognition of a bond berween Mixtec, Cuicatec and Amuzgo.

Among the attempts to classify these languages of Mexico I cite here as a bad example that of Jaime de Angulo, who abandoned the genetic hypothesis in favor of a novel theory of resemblance developed through 'mutual borrowing and infection.' This thesis, presented in two major articles[9] affirms that Zapotec, Chinantec, Mazatec, Chocho, Cuicatec, Mixtec and Chatino form a 'Zapotecan Group' but that they are not so grouped by virtue of genetic relationship but by virtue of similarity of morphological structure developed through extensive mutual influence and borrowing. It is on the grounds of a supposed absence of cognates that he denies genetic relationship: 'I had no sooner commenced taking down vocabularies than I was astonished at the utter lack of semantic similarity.'[10] In regard to Mixtec and Cuicatec he admits, however, that there is a considerable amount of vocabulary similarity but attributes this similarity to borrowing: 'There has evidently been a great deal of direct semantic borrowing of Mixtec words in Cuicatec. A great many Cuicatec semantemas are practically identical with Mixtec ones. The morphological features, however, except in so far as both languages partake of the type common to the whole group, show that the two languages are genetically different. When the semantemas are not practically alike they are utterly differing.'[11] De Angulo's argument here takes a curious turn, for he who had cited absence of vocabulary similarity and presence of morphological similarity in support of his thesis, now, when confronted with the opposite set of circumstances, viz. with presence of vocabulary similarity and absence of morphological similarity, pleads the latter set of circumstances in support of the same thesis! Futhermore, as a matter of fact the vocabulary similarity between Mixtec and Cuicatec is not a matter of practical identity between certain items in the two languages versus total difference between other items, but rather, the degree of similarity among cognates in these two languages varies according to the proto-phonemes involved in those forms and according to the characteristic developments of those proto-phonemes in the two languages (e.g. in ultimate syllables *ka> M, C ka; but *ndi> M či, C nę). Finally, there is no such absence of 'morphological similarity' as De Angulo indicates; but it is possible to sketch in reference to Mixtec, Cuicatec and Trique the broad outlines of a proto-grammar from which certain characteristic grammatical developments stem in each language. Thus, at the

point where I am best qualified to test it, de Angulo's hypothesis proves unsatisfactory. Nevertheless I have discussed his views somewhat at length with the purpose of underscoring the futility of such attempts to by-pass the comparative method.

I propose in this study to settle the question as to the linguistic affinities of Trique by demonstrating that Mixtec, Cuicatec and Trique reconstruct as a well-defined group with no obvious subgrouping of any two languages as opposed to the third.[12] This study leaves open the question as to whether Amuzgo reconstructs in the same relative time-depth with the other three languages or whether it represents a slightly earlier layering—in which case Amuzgo-Mixtecan might form a sort of Macro-Mixtecan family within the Olmecan stock. However, in spite of the fact that this study does not systematically take account of Amuzgo I am labelling the reconstructions here presented 'Proto-Mixtecan.' If Amuzgo should later prove to reconstruct roughly in the same time-depth as the other three languages, the systematic incorporation of Amuzgo will modify the picture of Proto-Mixtecan as here presented. If, on the other hand, Amuzgo should prove to reconstruct on a still earlier layer, the systematic incorporation of Amuzgo into the reconstructions of 'Proto-Macro-Mixtecan' will not seriously affect the reconstruction of Proto-Mixtecan proper as here presented.

The purpose of this study runs, however, beyond considerations of demonstrating relationships between these four languages to considerations relative to the structural characteristics—phonological and grammatical—of Proto-Mixtecan. For while Mason's emphasis on the degree of divergence within this linguistic group is perhaps not exaggerated, nevertheless Mixtec, Cuicatec and Trique have a sufficiently large stock of common cognates that the phonological and grammatical structure of Proto-Mixtecan can be perceived in broad outline if one will rigorously and patiently apply the comparative method.

1.2. Data and sources.

1.2.1. Word-lists. The following data, from various of my colleagues in the Summer Institute of Linguistics, have formed the basis of this study:

(1) The excellent Spanish-Mixtec, Mixtec-Spanish dictionary prepared by Ann Dyke in the Mixtec of San Miguel el Grande, Oaxaca. This dictionary contains about 2000 entries on the Mixtec-Spanish side and is liberally supplied with illustrative phrases and sentences that enhance the usefulness of the work (Vocabulario de la Lengua Mixteca de San Miguel el Grande, Oaxaca, Instituto Lingüístico de Verano, México, D.F., 1951).

(2) A copy of the same dictionary with the corresponding dialect forms of the Mixtec of San Esteban Atatláhuca, Oaxaca, written

in between the lines by Ruth Mary Alexander.

(3) A typed word-list prepared by Howard Klassen and based on Dyke's dictionary. This list contains Mixtec of San Miguel forms (copied from Dyke), Mixtec of Jicáltepec, Oaxaca forms, and Spanish translation. Unlike the Mixtec materials mentioned above, tone has not been transcribed on the forms in this word-list.

(4) A brief mimeographed word-list compiled by Cornelia Mak with 100 entries in four Mixtec dialects: those of San Miguel el Grande, Oaxaca; Jicáltepec, Oaxaca; Metlatonoc, Guerrero; and Xayacatlán de Bravo, Puebla (Vocabulario Comparativo de Cuatro Dialectos del Idioma Mixteco, Instituto Lingüístico de Verano, México, D. F., 1948). I have used this word-list chiefly as a source of information regarding the Mixtec of Metlatonoc. However, inasmuch as the Metlatonoc data incorporated by Mak in this word-list were recorded somewhat hurriedly by Edward Overholt and Herbert Whealy during a survey trip in that region, I have rechecked the Metlatonoc data with Overholt who has now been studying that Mixtec dialect for several years. However, although I have since obtained some additional data from Overholt, I have not had Metlatonoc data in quantity comparable to that on hand from the other three Mixtec dialects mentioned above.

(5) Several long word-lists in the Cuicatec of Concepción Pápalo, Oaxaca, prepared for me by Margaret Walker. These lists include some 800 nouns and some 700 verbs, with the latter listed along with variations for tense-aspect.

Overlapping somewhat with these lists but supplementing them to some degree is a list of some 600 items prepared by Marjorie Davis and Margaret Walker in the Cuicatec of Concepción Pápalo for use on their Cuicatec dialect survey.

(6) The Trique of San Andrés Chicahuaxtla data represents data from my own field notes as gathered from 1946 through 1952. I also obtained a brief list of some 364 words in the Trique of San Martín Itunyoso and of San Juan Copala during an afternoon spent in each village. This latter data was gathered hurriedly and has never been rechecked. Although I transcribed tone on the forms of the above two dialects I do not include this transcription here in that the tones as recorded are impressionistic and phonetic rather than phonemic. I also occasionally include dialect forms recorded at random during occasional contacts with speakers from Santo Domingo Chicahuaxtla, the 'twin' village of San Andrés.

(7) An Amuzgo word-list copied by me from the linguistic file of Cloyd Stewart. This list contains some 1300 items recorded by Stewart in the dialect of Ometepec, Guerrero. However, the fact that the transcription seems to reflect a few unsolved phonemic problems, together with the consideration that Amuzgo tone has not been analyzed and transcribed on the forms, decided me against trying to incorporate Amuzgo into the Proto-Mixtecan reconstructions at this time.

In referring to the above I use the following abbreviations: M-SM for the Mixtec of San Miguel el Grande, Oax.; M-SE for the Mixtec of San Esteban Atatláhuca, Oax.; M-J for the Mixtec of Jicáltepec, Oax.; M-M for the Mixtec of Metlatonoc, Guerrero; C for

Cuicatec of Concepción Pápalo; T-Ch for the Trique of San Andrés Chicahuaxtla whenever I quote forms from this dialect along with forms from other T dialects in a given set of cognates; otherwise T is to be understood as referring simply to this dialect; T-Co for the Trique of San Juan Copala; T-I for the Trique of San Martín Itunyoso; T-SD for the Trique of Santo Domingo; A for Amuzgo of Ometepec.

I also use the following abbreviations referring to reconstructed forms: PMx for Proto-Mixtecan, PM for Proto-Mixtec, PC for Proto-Cuicatec and PT for Proto-Trique.

1.2.2. Besides the above word-lists, this study draws on the following published articles:

(1) Pike, K. L. 'Tonemic Perturbations in Mixteco, with Special Emphasis on Tonomechanical Subclasses,' Tone Languages, 77-93, University of Michigan Publications in Linguistics, Vol. IV, Ann Arbor, 1948.

(2) Pike, K. L. 'Analysis of a Mixteco Text,' International Journal of American Linguistics, Vol. 10, No. 4 (October, 1944), 113-138.

(3) Pike, K. L. 'A Problem in Morphology-Syntax Division,' Acta Linguistica, Vol. V, No. 3, 125-138.

(4) Pike, K. L. 'Grammatical Prerequisites to Phonemic Analysis,' Word, Vol. 3, No. 3 (December 1947), 155-172.

(5) Pike, K. L. 'Note on Allomorph Classes and Tonal Techniques,' International Journal of American Linguistics, Vol. 19, No.2 (April 1953), 101-105.

(6) Mak, Cornelia. 'A Comparison of Two Mixtec Tone Systems,' International Journal of American Linguistics, Vol. 19, No. 2 (April 1953), 85-100.

(7) Needham, Doris and Davis, Marjorie. 'Cuicatec Phonology,' International Journal of American Linguistics, Vol. 12, No. 3 (July 1946), 139-146.

(8) Davis, Marjorie and Walker, Margaret. 'Cuicatec: Morphemics and Morphophonemics,' International Journal of American Linguistics, Vol. 11, No. 1 (January 1955), p. 46-51.

(9) Longacre, Robert E. 'Five Phonemic Pitch Levels in Trique,' Acta Linguistica, Vol. 7, No. 1, 62-82.

In the succeeding sections of this study I refer to the above nine books and articles with the following abbreviations (cited in parentheses in the body of the text and thus avoiding footnotes):
(1) TL, (2) AOMT, (3) PMSD, (4) GPPA, (5) NACTT, (6) CTMTS, (7) CP, (8) CMM, (9) FPPT.

1.3. Phonemic Transcriptions employed. In transcribing the Mixtec forms I follow the transcription of Pike and Mak except that (a) I transcribe M-SM nasalized vowels with nasal mark under the vowel rather than with post-vocalic -n; (b) I transcribe M-SM, SE v rather than b; (c) I transcribe M-SM, SE y rather than ž; (d) I transcribe

M-SM, SE ɪ rather than ə; and (e) I transcribe M-SE forms with hyphens joining items in the same stress-group (but with + preceding enclitics) following the precedent set by Pike in AOMT (but the + before enclitic is my own innovation). Inasmuch as the C word-lists were prepared for me in practical orthography rather than in phonemic transcription I make certain changes in the direction of the latter. My transcription of C is essentially that of Needham-Davis in CP except that I transcribe v rather than b, and e and ẹ rather than ɛ and ɛ̨. Davis and Walker (CMM, p. 46, fn 2) state that study subsequent to the publication of CP has convinced them that ɛ and ɛ̨ are freely varying allophones of e and ẹ respectively. In my own transcription of T, I depart in the following ways from the transcription employed in FPPT: š rather than ʃ ; y rather than j; ž rather than ʒ ; ɪ rather than ʌ ; and i̱, ẹ, etc. rather than ɪ̱, ɛ̨, etc. In the transcription of the tones, I transcribe M-SM and C high, mid, and low tones with ˊ¯ˋ respectively. I use the same three marks to transcribe respectively (1) the highest tone level of the M-SE four-level tone system; (2) the next to the highest level; and (3) the lowest level. The next to the lowest level is of such rare occurrence in our cognate sets (although not at all rare in M-SE tone sandhi variants) so as to be almost negligible; in those few forms in which it does occur I transcribe numeral ^{3} raised exponent-wise. The five tones of T, I number consecutively from high to low with raised numerals. In transcribing with identical diacritical marks the tones of M-SM and M-SE forms I high-light certain tone correspondences mentioned in 6.2. Trique, however, is distinct enough by virtue of its five tone system to warrant a differing tone notation. I could of course have transcribed the tones of the Mixtec and Cuicatec forms with raised numerals so as to make uniform the sort of tone notation employed in the three languages, but such uniformity of notation might possibly lead to some pseudo-identifications of Mixtec and Cuicatec tones with Trique tones: e.g. the tone '3' of the M-SM three-level system might in that case be superficially equated with the tone '3' of the Trique five-level system, while actually—as the lowest level of the M-SM tone system—the M-SM tone '3' is more parallel to the Trique tone '5'. There is, on the whole, I feel, less confusion with these differing sorts of notation in which Mixtec and Cuicatec tone are kept distinct from Trique.

1.4. Grateful acknowledgments are made here to those of my colleagues in the Summer Institute of Linguistics who have generously given of their time to prepare me word-lists; to Cornelia Mak for checking over an earlier draft of the array of cognates (Section 7)

for accuracy of the Mixtec transcription; to Marjorie Davis and Margaret Walker who similarly checked for me the Cuicatec of the array of cognates; to Henry Hoenigswald of the University of Pennsylvania for teaching me whatever I know of the comparative method and for suggestions and stimulus throughout this study; to the University of Pennsylvania for a George L. Harrison Scholarship and a University Scholarship, which made this study possible; and to Zellig Harris, my group chairman, whose Development of the Canaanite Dialects remains an inspiration to aspiring young comparativists.

NOTES

1. Manuel Orozco y Berra, Geografía de las Lenguas y Carta Ethnográfica de México, México, 1864.

2. Francisco Pimentel, Cuadro Descriptivo y Comparativo de las Lenguas Indígenas de México, México, 1865.

3. Antonio García Cubas, Atlas Pintoresco, Geográfico y Estadístico, México, 1888.

4. Lehmann, Walter, Zentral Amerika, Berlin, 1920.

5. Vivo, Jorge, Razas y Lenguas Indígenas de México, Instituto Panamericano de Geografía e Historia, México, 1941.

6. Mason, J. Alden, 'Native Languages of Middle America' in The Maya and Their Neighbors, New York, 1940.

7. Mason, p. 66.

8. Sapir, Edward, 'Central and North American Languages.' Encyclopedia Brittanica; 14th Edition. Vol. 5, 138-141. New York, 1929.

9. 'The Zapotecan Linguistic Group,' International Journal of American Linguistics Vol. VIII, 1-38; 'The Linguistic Tangle of Oaxaca,' Language I, p. 96 ff.

10. 'The Linguistic Tangle of Oaxaca' p. 97.

11. 'The Zapotecan Linguistic Group,' p. 33.

12. Since completing this study I have received from two sources further information confirming this claim regarding Mixtec, Cuicatec, and Trique along with some elucidation of the position of Amuzgo. This information is here summarized:

(1) Sarah Gudschinsky gives the following lexico-statistical data:

A. Using the 200 word list at first compiled and used by Swadesh:

Mixtec-Cuicatec	23.2%	3.4 millenia
Trique-Mixtec	22%	3.5 millenia (constant .805)
Trique-Cuicatec	20.9%	3.6 millenia

B. Using the more recent 100 word list of Swadesh:

Mixtec-Cuicatec	28.5	4.1 millenia
Trique-Mixtec	25.·	4.6 millenia (constant .86)
Trique-Cuicatec	25.8	4.5 millenia

In the former computation the standard error of 3.5 millenia is plus or minus .3 millenia, so that all three figures fall within the range of standard error of the middle one. In the latter computation the standard error of 4.5 millenia is plus or minus .5, so again the three figures are homogenous from a statistical point of view. (These interpretations along with the original computations are entirely the work of Gudschinsky). Thus, although there is a thousand years difference in time depth depending on the word list employed as basis for the computation, the figures bear out my contention that Mixtec, Cuicatec, and Trique reconstruct roughly in the same time depth without any obvious subgroupings.

(2) Robert Weitlaner has sent me a reprint of an article of his to which I did not formerly have access (Los Pueblos no Nahuas de la Historia Tolteca y el Grupo Lingüístico Macro Otomangue, Revista Mexicana de Estudios Antropologicos, Vol. 5, No. 2-3, 249-269). This article, which contains the same classification found in the Mendizábal-Moreno map mentioned above, groups Mixtec, Amuzgo, and Cuicatec into the Mixtecan family and Trique into the Popolocan family with the reservation that "El Trique se puede considerar tal vez mejor como un eslabón entre las familias Popoloca y Mixteca." (fn. 2, p 251). However, in the pedigree chart of Macro-Otomanguean languages (p 269) Weitlaner puts Trique on the Mixtecan rather than on the Popolocan side of the common Mixtecan-Popolocan trunk. Weitlaner thus foreshadows the classification of this study more nearly than any of those mentioned in the body of this work.

Certain unpublished vocabulary counts of Weitlaner compiled before the days of lexico-statistics are of interest here in that while they show fairly close clustering of Mixtec, Cuicatec, and Trique, they tend to give smaller percentages of common vocabulary for Amuzgo with these languages. I here give these results without further comment (the lists on which the percentages are based contain 103 Mixtec words, 102 Cuicatec words, 96 Trique words, and 53 Amuzgo words): M-C 57%, C-M 57%, M-T 55%, T-M 59%, C-T 48%, T-C 51%, M-A 27%, A-M 52%, C-A 21%, A-C 41%, T-A 54%, A-T 45%.

2. Diachronic and synchronic phonemic systems

2.0. In this section the phonemic systems of Mixtec, Cuicatec, and Trique are briefly summarized in rough structural comparison with each other and with the phonemic system reconstructed for PMx. Detailed discussion of particular sound correspondences will come in the following sections; sound correspondences as such are sketched here only in broad outline, since the main concern is to compare the systems as systems.

2.1. The consonants of PMx, M, C, and T.

2.1.0. In the accompanying chart the consonant phonemes reconstructed for PMx are given in the first column and the consonant phonemes of M, C, and T are given in the second, third, and fourth columns respectively. Parentheses inclose phonemes introduced from Spanish. Brackets inclose certain C or T clusters that are parallel to unit phonemes in M or PMx. The juxtaposition of phonemes from various languages across columns is not intended to imply anything definitive as to historical relationship, but is designed to facilitate comparison of the systems.

Notice that the PMx consonants line up into four main groups: (a) stops, *t, *k, *k^w; (b) spirants, *θ, *x, *x^w; (c) prenasalized stops, *^{n}d, *^{n}g, *$^n g^w$; (d) nasals and semivowels, *m, *n, *ñ, *w, *y. In respect to these groups the phonemes *ʔ and *l are extrasystematic. For convenience, however, *ʔ is discussed here along with the stops, and *l along with the nasals and semivowels.

2.1.1. Phonetic nature of M, C, T consonants.[1]

(1) Stops p, t, č, k, k^w, and ʔ are voiceless unaspirated in M and T. The T stops are fortis in that they are characterized by phonetic gemination in intervocalic and by vigorous articulation. C stops and affricates are voiceless and slightly aspirated with voiced allophones occurring after nasals and with unaspirated allophones occurring in cluster with ʔ. There is a contrast in C between [n-t] and [nd] (with n̩ symbolizing syllabic nasal and hyphen symbolizing morpheme boundary). These clusters can be alternatively phonemicized as (a) nt and nd—with the statement that n preceding t is always syllabic (with intervening morpheme boundary), or as (b) n̩t vs. nt—with the statement that t is not voiced after syllabic nasal. However, since contrasting phonemes t and d exist in C (although the latter is a spirant), I prefer to assign the voiced

PMx	M	C	T
	(p)	(p)	(p)
*t	t	t	t
			c
	č	č	č
*k	k	k	k
*k^w	k^w	k^w	[kw], [gw]
*?	?	?	?
	v	v	v
*θ	d	d	d
*x	g		g
	h	h	h
*x^w			
	(^{m}b)		[mb]
*^{n}d	^{n}d	[nd], [nt]	[nd]
	^{n}ǰ (SM,SE)	[nč]	
*^{n}g	^{n}g	[nk]	[ng]
*$^n g^w$		[nkw]	[ngw]
	s	s	s, z
	š		š, ž
*l	l	l	l, l•
	r	r	r
*m	m	m	m, m•
*n	n, N (only SE)	n	n, n•
*ñ	ñ	[ny]	
*w			w, w•
*y	y	y	y, y•

Consonants in PMx, M, C, and T

stop [d] after n to the d phoneme, and therefore adopt alternative (a).

(2) M, C, T v is a bilabial fricative varying phonetically to [w] in certain phonological situations in some of the M dialects.

(3) M d and g along with C d are voiced fricatives; T d and g are lenis consonants varying from slight to full voicing and from stop to fricative under conditions partly positional and partly free.

(4) M h varies from velar fricative to frictionless spirant, while C h is a velar fricative, and T h is a simple aspiration (with a velar fricative allophone introduced by Spanish loans).

(5) M ^{n}d, ^{n}ǰ, and ^{n}g are prenasalized stops.

(6) M s and š along with C s are dental and alveopalatal sibilants. In M-SM certain speakers have a contrast between normal and retroflexed š; this is by-passed in the present study, but should some day be investigated. T s and š are fortis in that they are phonetically lengthened, consistently voiceless, and articulated with some vigor. T z and ž are the corresponding lenis sibilants, which vary from voiceless to voiced.

(7) l is a lateral in all languages.

(8) r has trill/flap allophonic variation in M and C, but is a sort of flapped, retroflexed sibilant in T.

(9) M y varies phonetically from [y] to [ž] but is always the former in clusters.

(10) T l•, m•, n•, w•, and y• are lengthened and phonetically syllabic. This syllabicity is clearly sub-phonemic in that the pitches recorded on these long consonants are non-contrastive while syllabic phonemes always bear contrastive tone.

2.1.2. Distribution of M, C, T consonants. M is here discussed with special detail in that it appears to be in some ways especially typical of the languages of this family.

2.1.2.1. In Mixtec.

2.1.2.1.1. A disyllabic unit which we here for want of a better term call the 'couplet' is the primary distributional matrix in M. This matrix consists of one disyllabic morpheme plus or minus additional morphemes that do not involve an additional syllable—viz., a consonantal proclitic; or a consonant, vowel, or tone replacive. The M couplet, thus defined, is phonologically marked by optional lengthening of its medial consonant (with voiceless element before medial t or k in M-M, e.g., šita [šihta] tortilla), and by optional stressing of its first—never its second—syllable. The couplet has a restricted number of canonical patterns summarized in the formula (C) CV (ʔ) (C) V(n)—elements in parentheses are optional; all combinations of obligatory and optional elements occur except CVʔCVn.

2.1.2.1.2. The couplet—especially when exhibiting CVV or CVʔV

pattern (with identical vowels)—is phonologically reduced to one syllable in certain sequences. Pike, in two carefully written articles (AOMT, PMSD), has cogently shown that such reduced forms can not be analyzed with any consistency for M as affixes nor can sequences involving such reduced forms be consistently analyzed as compounds. There is, on the one hand, a clearly defined distributional matrix of two syllables in reference to which we can with great convenience describe the distribution of M phonemes; and there are, on the other hand, various grammatical layerings beginning within the disyllabic matrix itself and extending on up through the phrase, the clause, and the sentence. Various phonological clusterings and groupings cut across these grammatical layers at various points. The points of grammatical and phonological cleavage do not necessarily coincide. The disyllabic matrix itself, i.e. what we here term the couplet, is at least a unit not interrupted by pause as well as a unit of great descriptive convenience. In using the term couplet rather than 'morpheme' (Pike and Mak use the latter term), I am suggesting a term broad enough to allow some morphemic complexity within the unit.

2.1.2.1.3. The second pertinent phonological unit in M—beyond the couplet which has a certain phonological significance in that it is not interrupted by pause, lengthens its medial consonant, and entails certain restrictions on the distribution of the vowels and consonants within it—is a sequence which may be termed the stress-group. Two sorts of M stress groups are indicated by Pike (AOMT):

(a) Stress group with one couplet (normally unreduced) preceded by one or more reduced couplets and/or followed by one or more reduced couplets: tẽ-nì-kẽⁿdɑ̃ and came out (<tẽẽ and, nīì completed action, kẽⁿdɑ̃ to come out); kʷɑ̃̀ʔɑ̀-tʸí(the) animal goes, (<kʷɑ̃̀ʔɑ̀ to go, kʸítʸí animal); nú-mà-ñíʔ-ò-dé if we can't obtain a man (<núú if, hypothesis, mɑ̃̀ɑ̀ potential negative, ñīʔì to obtain, yóó we, čɑ̀ɑ̃́ man—with suppletive alternate dé in reduced form); ⁿdé-nì-hĩ̀nì-rì whereever have I seen...(<ʔõⁿdè where, nīì completed action, hĩ̀nì to see, rūù I). (b) Stress-group with two reduced couplets: ⁿdé-ó we'll see (<ⁿdèʔé to see, yóó we); kú-à it will be that...(<kūū to be, hɑ̃̀ɑ̀ thing that, that which).

Of the unity and reality of the M stress-group, there can be no doubt. I have not, however, been able to obtain detailed phonetic data as to the distribution of stress itself within the stress-group. Ann Dyke informs me that the main stress usually falls on the first syllable of such a unit, but that a secondary and weaker stress often falls on the first syllable of the unreduced couplet. By contrast in a phrase such as yɑ̃́ú kɑ̄vɑ̄ cave (which does not constitute a stress-group) there are two almost equally strong stresses on both nouns.

2.1.2.1.4. In citing M forms here and in the following sections I use hyphen to separate the component couplets of the M stress-group whether those couplets are full or reduced, except that, reduced couplets following the unreduced couplet I separate from each other and from the preceding unreduced couplet by +. By thus using a quasi-juncturał symbolism I keep distinct enclitic elements from various preposed elements. This is of some advantage in that enclitic elements are often subjected to an especially radical sort of phonological reduction: yúkᾳ̨ > +ų́ that thing, sùčí > +i child, yóó > +yo/o we, our. Furthermore, +r is a flap while elsewhere r is a trill; and d and g occur only after +—in which position, however, they contrast with t and k respectively.

Space may be taken to symbolize the beginning and end of a stress-group. But, in that most couplets may be pronounced as isolated forms, most couplets are potentially stress-groups. Therefore, space preceding and following such a form as yúkᾳ̨ is an implicit summary notation that the first phoneme y follows pause or rhythm-break in at least some contexts and that the last phoneme ᾳ̨ precedes pause or rhythm-break in at least some contexts. Such a summary notation—albeit implicit—is of some value in working with reconstructed materials where the items reconstructed are not whole utterances but, for the most part, isolated items forever separated from the context of living language in which they once occurred. Therefore, *CVCV (with space preceding and following) informs us that in some contexts the first consonant of the reconstructed form followed pause or rhythm-break while the second consonant never followed pause or rhythm-break in any context. Since we presume that the sum total of phonological situation in which the now isolated reconstructed items once occurred has affected its historical development, these facts, implicitly summarized by the spaces, are of significance.

2.1.2.1.5. After space there occur all consonants except ^{n}g, d, and g; the first consonant occurs only in couplet-medial, the latter two occur only following +. After space there also occur the following clusters: sč, sk, sk^{w}, st, šn, š^{n}d. In couplet-medial all consonants occur except r; the following clusters also occur in this position: ʔv, ʔ^{n}d, ʔl, ʔ^{n}ǰ, ʔm, ʔn, ʔñ, ʔy. In M-SM there is an unique occurrence of st in medial position. Preceding space no consonant appears. In M-SM data, as phonemicized by Pike, there is final -n, but phonetically -n is simply the nasalization of the preceding vowel, or of the preceding vowels in words CV(ʔ/h)Vn (with both vowels identical). Pike in positing -n in M analyzes the nasalized vowels into simultaneous components, splits off an -n component, and identifies this component with the consonant n that occurs elsewhere. Mak, following a somewhat different analysis, simply sets up the nasalized vowels

as phonemes. In citing M forms in this paper I follow the latter usage, and retranscribe M-SM Vn forms as Ṿ.

2.1.2.2. In Cuicatec.

2.1.2.2.1. The following statement of the distribution of C consonants is substantially that of Needham-Davis (CP) modified somewhat by my own inspection of the C data available to me: All consonants occur in utterance-initial. In the same position occur the following clusters: (a) ʔ followed by any consonant except r, s, h, and č; ʔ preceded by č and r; and the complex clusters ʔty, ʔdy. (b) n followed by t, č, k, k^w, d, and y; and the complex clusters nčʔ, nʔd, nʔy. (c) y preceded by t, č, k, d, v, ʔ, and n (the last two are included also under (a) and (b) respectively); and the complex cluster sʔy. (d) Clusters unique as to type: mbl, st. Within the utterance occur clusters listed above plus: (a) ʔs, and ʔč, (b) nty, nky, ndy, nʔk, nʔk^w, and nʔn, (d) mʔb, and sʔt. Utterance-final, only ʔ occurs among the consonants. In rapid speech certain vowels are dropped in utterance-medial between enclitic morphemes and following morphemes. This results in the occurrence of a great many heavy consonant clusters involving up to six members (e.g., ʔmsnʔt, ʔmnʔb, dsnʔt). These latter clusters represent an exclusively C development which has no historical significance.

2.1.2.2.2. C canonical forms are mentioned briefly here for comparison with the M couplet; they will be more fully discussed in 2.2.2.2. In C forms of one or two syllables the following schematically represented canonical forms are most common: (a) CVV $\pm$ V/ʔ, (b) CVVCV $\pm$ʔ, and (c) CVʔV $\pm$ V/ʔ. In the above formulae C represents any single consonant or consonant cluster subject to the distributional limitations sketched above. Stress tends to fall on the first syllable of these forms as in the M couplet; but syllable break falls between the second and third vowel of a sequence of three vowels (i.e., CVV.V), and before the medial consonant elsewhere (i.e., CVV.CV, CV.ʔV, and CV.ʔVV). In structural type, M CVV corresponds to C type (a), viz., CVV, CVVV, or CVVʔ; while M CVCV corresponds to C type (b), viz., CVVCV or CVVCVʔ; and M CVʔV corresponds to C type (c), viz., CVʔV or CVʔVV. Historically the simpler forms preserved in M seem to be the more representative of PMx structure (except for loss of final *-ʔ). The C forms probably resulted from a lengthening of the vowel of the first syllable under stress. Since these C patterns here summarized do not give quite the complete picture (a few minor patterns exist), we may assume that the regularity of this development was broken by some factors unknown to us, so that the lengthened vowels became phonemic as geminate vowel sequences paralleling other VV sequences of dissimilar vowels developed by C diphthongization.

2.1.2.2.3. There apparently is a stress-group in C with a structure roughly parallel to that of the M stress-group. Characteristically, the C stress-group consists of one of the canonical forms schematically represented above preceded by various preposed CV-elements and followed by various postposed +CV elements: í-nā-dà-kùùkū+dē he will decorate (something). Walker-Davis also hyphenate together such sequences as ī-ɨ̰ɨ̰-yą́ą́-hīīnú+dē he is happy (i- continuative, hīīnú inside with the other constituents unknown to me). Walker informs me that in such 'compounds' as these there is alternating stress on the component forms from + on back. Possibly such sequences as these compose a further sort of stress-group in C. In my transcription of C data I hyphenate preposed CV-forms, but generally leave the latter sort of sequences separated by space. I have in a few instances, however, hyphenated CVV forms to following CVVCV forms particularly when such sequences are specifically cited as 'compounds' in CP.

2.1.2.3. In Trique.

2.1.2.3.1. The phonological word is well marked in T in that (a) non-phonemic stress and non-phonemic lengthening of unchecked vowels occur regularly on the final syllable before space; (b) syllable final h occurs only before space (syllable final ʔ occurs both before space and elsewhere; there are no other consonants before space); (c) syllables interrupted by ʔ or h occur only before space; (d) nasalized vowels occur only in syllables final in respect to space—except for the proviso that when the consonant separating the previous syllable from the final syllable is ʔ the nasalization may carry back through an identical vowel in the preceding syllable; (e) sequences of two or three tone registers appear only on syllables final in respect to space; (f) fortis consonants, t, k, s, š, l•, m•, n•, y•, and w• appear only in such final syllables. Furthermore, T fortis lateral, nasals, and semi-vowels occur only following space as well and are therefore restricted to monosyllabic words. Nevertheless, although the phonological word is well marked in T it may contain elements that layer grammatically not simply with itself but with a sequence of words and which are therefore analyzed as clitics.

2.1.2.3.2. The preceding paragraph has anticipated certain features relative to the distribution of T consonants, viz., the restriction of fortis consonants to syllables immediately preceding space. In these final syllables all T consonants appear, while in non-final syllables the fortis-lenis contrast is neutralized and consonants of a non-distinctive sort—phones here assigned to the lenis phonemes—occur. The affricated stops c and č are limited to final syllables in most idiolects—although some speakers pronounce č rather than ž in the

non-final syllable of a few words. Semi-vowel w does not occur before o or u; y does not occur contiguous to i except across space. When morphological combinations would bring together these restricted combinations the semi-vowel is lost.

The following clusters of consonants occur in T words not borrowed from Spanish; clusters introduced by loans are, of course, pertinent synchronically but have no diachronic interest: ky, kw, gy, gw, dr, nd, ng, ngw, ʔw, ʔn, ʔm, ʔl, ʔng, hn, zd, zn, zgw, žy. The latter two are each of unique occurrence in my present T data. Cluster ky occurs only across morpheme boundary. The above clusters occur most typically in final syllables; only gw, dr, ng, ʔn, zd, and zn are of at all frequent occurrence in non-final syllables.

2.1.3. PMx consonants relative to M, C, T consonants.

2.1.3.0. Fifteen consonants are reconstructed for PMx. In the present-day languages there are 22 consonants in M-SM (including ^{n}ɟ occurring in this dialect and in M-SE), 23 in M-SE (including N which is not found in the other dialects here studied), and 21 in M-J (which has neither of the two additional consonants mentioned above). In C there are fifteen consonants, and in T-Ch there are twenty-four. In the following paragraphs we first consider C since it has the simplest system.

2.1.3.1. C, like PMx, has a series of voiceless stops, t, k, k^{w}, and ʔ, but adds p (from Spanish loans), and č (developed, in the main, from palatalization of *k and *x before front vowels). Final ʔ is preserved in some instances and lost in others. The occurrence of C doublets from the same root—one form with -ʔ and the other form without it—probably results from an old sandhi pattern in which certain *ʔ (space) C clusters were reduced by loss of first member. C has two voiced spirants, v and d, and two voiceless spirants, h and s. PMx had but two voiceless spirants, *θ and *x. C v is a regular reflex of *w and C d is a regular reflex of *θ. The C voiceless spirant h—which is limited to non-final syllables and to monosyllabic CVV forms—represents to a large degree a development of *x in those positions. C s is almost entirely limited to non-final syllables and even in the latter situation its occurrence is largely in forms involving the prefix sa-<u>animal</u>. Origins of both the prefix sa- and the phoneme s remain obscure. C l and r are rare phonemes; the former is a continuation of PMx *l, while the origin of the latter is obscure. C m, n, and y represent continuations of the corresponding PMx phonemes except that C y is also a regular reflex of PMx *ñ. The PMx prenasalized stops have no corresponding unit phonemes in C, although the C clusters nd and nk (the latter as a reflex of both *^{n}g and *^{n}g^{w}) represent reflexes of these PMx consonants under certain phonological conditions.

In summary, C modifies the PMx consonant system by adding two additional stops; by doubling the number of spirants—including a shift of PMx semi-vowel *w into the spirant series; by eliminating the series of prenasalized stops as unit phonemes; by adding a new liquid, r; and by decreasing the number of nasal consonants from three to two.

2.1.3.2. M adds two new stops, p (from loans), and č (chiefly from palatalizations of PMx *t, *x, *x^w, *^{n}g, and *^{n}d in phonological situations varying from dialect to dialect). Final *ʔ is lost everywhere. Medial clusters of *ʔ plus lateral, nasal, semi-vowel and prenasalized stop are preserved on the whole. M, like C, shifts *w into the spirant series as v (with a stop allophone). The other two M voiced spirants, d and g, are of such limited occurrence as to be almost negligible; g is, however, a reflex of PMx *x following +. The three M voiceless spirants represent a rather different development than C h and s, in that M h is a reflex of *x, *x^w, and *^{n}g in M-SM, SE final syllables, and of *x in M non-final syllables; while M s and š are largely reflexes of *θ (with the š after front vowels). M, like PMx has a prenasalized series, with four such phonemes in M-SM and M-SE (where ^{n}ǰ occurs) but only three such phonemes elsewhere. In the M prenasalized series a phoneme corresponding to *^{n}g^w is not found, but a new phoneme *^{m}b comes in from Spanish loans. M, like C, has two liquids, l and r. While the origin of M r is somewhat obscure it seems possible that it may have developed originally from an allophone of *l (see next section). M m, n, ñ, and y represent the corresponding PMx phonemes. M-SE N is a reflex of PMx *tn which simply gives t in M-SM, J.

In summary: M increases the number of stops from four to six; increases the number of spirants from two to six—including a shift of *w to the spirant series and the split of *θ into two M sibilants; eliminates one of the PMx prenasalized stops but adds one or two new stops in this series, depending on the particular dialect; adds a new liquid r—possibly by split of PMx *l; and develops a voiceless nasal in one dialect (M-SE).

2.1.3.3. T is the most innovating of the three languages in respect to its treatment of the consonants. PMx stops are retained, but *t regularly becomes T č in all environments while T t is largely a reflex of *θ in T final syllables before central and back vowels. T adds a further affricated stop c which developed originally from *θ before front vowels. PMx *k and *k^w remain in T final syllables but are merged to the lenis stop g in non-final syllables; T gw cluster is largely a development of g in the situation u...a. PMx final *ʔ is retained except after proto tone 1 (the highest level), but splits into -ʔ and -h in other situations. This split is conditioned by the consonant and vowel quality as well as the tone pattern of the syllable

which it closes. Proto clusters of *? followed by another consonant are in many cases metathesized from ?CV to CV?; this metathesis was an early enough development in T that the final ? thus developed shares in the same sound changes as those previously stated for the original final *?. T lenis consonants d and g represent to a large degree developments in non-final (stressless) syllables; the influence of Spanish either was a factor in their becoming phonemic or in reinforcing the new contrast by bringing in loans with d and g in ultimate syllables. T d in non-final syllables is from PMx *^{n}d and *θ. The PMx prenasalized series is preserved intact in corresponding T clusters nd, ng, and ngw; and mb is added from Spanish loans. Origin of the T sibilants is only partially understood. T z and ž in non-final syllables are reflexes of *θ (before front vowel) and of *t respectively; the provenience of these phonemes in final syllables—where their occurrence is statistically rare—remains obscure. Fortis s and š seem to be relatively recent splits from z and ž—a development in which Spanish loans may have played a role. T r is a reflex of *tn in the final syllables of a few sets; in non-final syllables it represents a fusion of preposed čV element and following stem. T l, m, n, ñ, w, and y are reflexes of the corresponding PMx phonemes; the fortis T l', m', etc. reflect an extension in T of the fortis-lenis dichotomy by reinforcing these phonemes in monosyllabic words. This was usually a compensatory development on loss of penultimate syllables, but since some unanalyzed factors have interfered with the regularity of the development, these lengthened phonemes have become phonemic.

In summary: T modifies the PMx consonant system—which was oriented according to (a) stops, (b) spirants, (c) prenasalized stops, and (d) laterals, nasals, and semi-vowels—by reorienting the entire system according to a new fortis-lenis dichotomy, so that only T č, c, r, h, and ? are not thus distinguished. In this reorientation of the consonant system the T voiceless stops become fortis phonemes; T voiced stop-spirant phonemes come to pattern as lenis; the voiceless allophones of z and ž become phonemic; and the lateral, nasals, and semi-vowels were split along the same lines, in that the lengthened varieties of these phonemes became phonemic. Not involved in the emerging fortis-lenis cleavage were the additional phonemes č and c developed in T. One further T innovation is the split of *-? into ? and h. In one interesting respect T is conservative: although reinterpreted as clusters, the prenasalized stops are preserved more faithfully than in any other language.

2.1.4. Probable phonetic nature of PMx consonants.

2.1.4.0. The comparative method reconstructs the phonemes of an

extinct language not its phonetics. Nevertheless, from a consideration of the phonetic qualities of the reflexes of a reconstructed phoneme something can be argued as to the phonetic characteristics of that phoneme. Such considerations can not, as a fact, be ignored; a posited course of development in the history of a language is customarily scrutinized from the standpoint of its phonetic plausibility. I therefore sketch here what can with some assurance be conjectured in regard to the phonetic characteristics of PMx phonemes.

2.1.4.1. It is reasonable to reconstruct the PMx stops as voiceless in view of the fact that these phonemes give voiceless reflexes. It is possible that *ʔ may either have been aspirated or had an allophone h in certain situations; in PT such allophonic variation existed with the spirant allophone become phonemic in present-day T.

2.1.4.2. The PMx spirants can be reconstructed as voiceless or voiced. It is slightly more plausible phonetically to reconstruct them as voiceless in that phonetic developments in each language are thus more easily accounted for: (1) in M, the spirants have voiceless reflexes, but *θ develops a grooved articulation (s and š). (2) In C, *θ is voiced to d (phonetically ḏ); *x is palatalized to č; and *x^{w} becomes ku or v. (3) In T, *θ is voiced in non-final syllables, but given a stop articulation (t) before central and back vowels in final syllables, and a stop articulation with sibilant offglide (c) before front vowels in final syllables; *x, in somewhat parallel fashion, gives ž in non-final syllables (from previous palatalization to č), but is given a stop articulation (k) before central and back vowels in final syllables and is palatalized to č before front vowels in final syllables; while *x^{w} is voiced to gw in most situations. These posited developments would be more complicated if we were to assume voiced spirants as the PMx phonemes laying behind these various phonological developments. On such an assumption we would have to state, for example, that in M the PMx alveolar (or dental) spirant was both given a grooved articulation and unvoiced, while by positing PMx *θ we need assume that only the former development took place. It is curious that PMx has no sibilant phoneme, and if we posit PMx *θ it is plausible to assume that this phoneme had a sibilant allophone before PMx front vowels.

2.1.4.3. The prenasalized stops seem to reconstruct as unit phonemes. PMx consonant clusters possibly included only clusters of *ʔ followed by another consonant, and the anomalous cluster *tn (see 2.1.4.5.). However, the PMx prenasalized series may have come from pre-PMx clusters in forms in which the first syllable ended in *-m (varying morphophonemically to n before *t, *k, and *kw) while the second syllable began with a stop. These pre-PMx

clusters would have been structurally parallel to the PMx *?C clusters in forms with first syllable ending in *? and second syllable beginning with a consonant. It is quite probable that there were clusters with *m/*n followed by other consonants than stops, (e.g. PMx *ñ <pre-PMx *ny), but that the *m/*n was lost without trace in most situations (See 2.2.4.3.). In pre-PMx the prenasalized stops were, therefore, probably the clusters *nt, *nk, and *nk^{w} with the stops phonetically voiced after the nasal. Since there were other clusters of nasal plus consonant not of the stop variety (possibly almost any consonant could thus occur as second member of a cluster of this sort) and since there was a parallel series of *?C clusters, the nasal plus stop sequences were pre-PMx clusters rather than unit phonemes. It was precisely the reduction of the other *mC and *nC clusters containing consonants not of the stop variety which left these nasal plus stop clusters (and *ny) structurally isolated and led to their reinterpretation as unit phonemes in PMx. It is interesting to note that in T they pattern once more as clusters.

2.1.4.4. There is little to say about the phonetic characteristics of the remaining consonants. The lateral *l in early M and C (and to some degree in T) substituted for the Spanish trilled or flapped r in loanwords: e.g., M-SM lātú, C lāātū <Sp. arado plow; M-SE lélú <Sp. sombrero hat; T le^{2}ru^{3}< Sp. arriero mule-driver. Furthermore, with some C speakers l and r are in free variation in a few words. This makes it appear plausible that the PMx lateral may have had a range of articulation that included certain 'r-colored' allophones. Further possible evidence for this is seen in the following etymology: M-SM +rò, M-SE +ró (with unabbreviated forms róó and ró?ó respectively) you; T re^{5}? you (formal) perhaps < *+lɔ?—since there is a PMx *l phoneme but no evidence for *r (the T reflex e rather than the more usual reflex a is another instance of 'r'-effect in T, 4.2.6.2.). This etymology, which stands alone, may indicate that *l had an allophone [r] following PM*+.

PMx *ñ is here considered a unit phoneme in that there is little evidence that medial clusters of *Cy occurred; at any rate in PMx the only clusters of at all frequent occurrence seemed to have been the *?C variety already discussed. PMx *ñ, as suggested above, probably is a development from pre-PMx *ny cluster.

2.1.4.5. The anomalous cluster *tn, mentioned above in connection with the origin of the M-SE phoneme N, is the only PMx cluster not of ?C variety that is here posited with any confidence, (cf. speculation in 4.2.5. regarding possible PMx penultimate clusters of dental followed by *y). In that such a cluster has no structural parallel in PMx, the question may well be raised as to whether or not it

should not be regarded as a unit phoneme in spite of the consideration that phonetic sequences of the pattern stop plus nasal are not usually so analyzed in present-day languages. This consideration may in turn suggest the possibility that *tn is not the most fortunate reconstruction for this problematical sequence (which gives M-SM, J reflex t, M-SE N, and reflexes tn or šn in M dialects not regularly cited in this study). In this connection the T reflex r of ultimate syllable *tn is provocative in view of the possible tie-in of M, C, T r and l as suggested in the above paragraph. It is therefore possible that such a unit phoneme as *tl, so characteristic of the Nahuatl stocks, is a more fortunate reconstruction than *tn. I retain the latter here, but do not want to discount the alternative possibility.

2.2. The vowels of PMx, M, C, and T.

2.2.0. In the accompanying chart the vowels of PMx, M, C, and T are juxtaposed in vertical columns. PMx *Vm is reconstructed as the source of nasalized vowels in the three daughter languages. This is not simply an analysis of nasalized vowels in terms of simultaneous components—as Pike's analysis of nasalized vowels in M-SM—but points to a time in early PMx or pre-PMx when the nasal timbre of these vowels was a sub-phonemic modification conditioned by a following nasal, viz., the syllable final *m already mentioned. This is discussed in some detail under 2.2.4.3.

2.2.1. Phonetic nature of M, C, T vowels.

2.2.1.1. M, C, T i is high, close, front unrounded varying freely to a more open allophone in C before +. M, C, T e is mid, close, front unrounded except that (a) in M an open allophone occurs in couplets of CV?V pattern, and in the first syllable of couplets of CVCV pattern when the medial consonant is a prenasalized stop or t; (b) in T there is a similar open allophone in a few restricted situations (after l*; and after r in non-final syllables when the following consonant is other than ?); (c) and in C such an allophone occurs as a free variant of the phonetically more close vowel. M, C, T a is low, central, varying freely to a somewhat back rounded [ɔ] allophone in C; u is high, close, back, varying freely to an open allophone in C before +; and o is mid, close, back rounded. M ĭ is high, close, back unrounded with a more central allophone after alveolar consonants; it is found in M-SM, SE but not in M-J, M; T i is high, close, central unrounded; it is only found in T-Ch. T ʌ is a central vowel of neutral timbre found only in T-Ch and of restricted occurrence even in that dialect. The nasalized vowels are of approximately the same quality as the oral in all three languages —except for the additional nasal timbre. In C, however, ą is somewhat raised, backed, and rounded; while in T ą is raised somewhat

PMx	M	C	T
*i	i	i	i
*e	e	e	e
*ĭ	ĭ (only SM, SE)		ĭ (only Ch)
			ʌ (only Ch)
*a	a	a	a
*u	u	u	u
*o	o	o	o
*ɔ			
*im	i̯	i̯	i̯
	e̯ (only SE)	e̯	e̯
*ĭm	ĭ̯ (only SM, SE)		ĭ̯ (only Ch)
*am	a̯	a̯	a̯
*um	u̯	u̯	u̯
*om	o̯	o̯	o̯
*ɔm			

Vowels in PMx, M, C, and T

towards the position of T ʌ (which itself is never nasalized).
2.2.1.2. M-SM has all vowels nasalized except e; while in M-SE even the latter vowel is nasalized. In C all vowels occur nasalized. In T-Ch all vowels occur nasalized except ʌ, but ę and ǫ appear to be rather recent developments influenced, at least in part, by Spanish loans. Spanish -en and -on become T ę and ǫ respectively according to a regular treatment whereby any Spanish vowel plus final -n becomes the corresponding nasalized vowel in T.
2.2.2. Distribution of M, C, T vowels.
2.2.2.1. In Mixtec. Only one vowel occurs to a syllable; and every vowel determines a separate syllable. Therefore, such sequences as CVV and CV?V are considered bisyllabic.

There are certain restrictions on vowel sequences. These are summarized by Pike as follows (Pike used the term 'morpheme' to describe the two-syllable distributional matrix that I term 'couplet', but he avoids examples that are morphemically complex; his statements of vowel restrictions would apply equally well, I believe, to what I term the M 'couplet'):

> Once the morpheme unit has been recognized in Mixteco, one finds that there are systematic restrictions in the sequences of vowels that may occur within it. The vowel sequences are correlated with the syllabic pattern of the morpheme, CVCV, for example, being less restricted than CV?Vn. Contiguous sequences (as in CVV) are much more heavily limited than noncontiguous ones (as in CVCV), and the types with final nasalization (CVCVn, CVVn, CV?Vn) are more limited than corresponding types without nasal.....The six vowels, i, a, u, ï, e, o fall into two groups according to the freedom with which they occur in sequences within stems. The first three, forming the outer points in the vowel triangle, are relatively unrestricted. The second three, occupying inner points in vowel triangle, are very considerably restricted.....Except for the two least frequent of the stem types ending in nasality (CVVn and CV?Vn), there are occurrences for all stem patterns of: (a) all repeat sequences (i-i, e-e, etc.) both for outer and inner vowels; (b) all possible sequences of outer vowels (i-a, i-u. a-i, a-u, u-i, u-a). Sequences of inner vowels with each other are almost completely lacking: o-e in the morpheme ?ō^{n}dè 'up to' is the only case that has been found. The most usual combination of inner vowels is the repeat: ï-ï, e-e, o-o.....The vowel e is the most restricted of all, occurring only in CeCa [and in CeCu, R.E.L.]. No combinations of o with u are found; since the same is true of e with i, one can generalize to the extent of pointing out that (except for repeat sequences) no combinations of palatal with palatal vowel or of labial with labial vowel occur. (GPPA 167-169)

There are restrictions on the occurrence of nasalized vowels: In CVCV forms only the vowel of the final syllable is nasalized. In

CVV, CVhV and CV?V forms, the vowels of the form are either both nasalized or both non-nasalized.

2.2.2.2. In Cuicatec. One or two vowels may occur in a syllable. Geminate clusters occurring in the same syllable involve all vowels nasal and non-nasal. Clusters of diverse vowels in the same syllable include ai, ą̨i̯, and ei, ę̨i̯,[2] plus a few other clusters—eo, ę̨o̯, iu, and i̯u̯ (which occur only before -? in a grammatical construction involving the fusion of an enclitic -u?/-o? with the preceding stem vowel).

Leaving out of account here certain longer morpheme sequences in the C stress-group and focusing our attention on forms roughly parallel in structure and function to the M couplet, we may describe the distribution of one-vowel syllables versus two-vowel syllables as follows: (a) forms involving two successive two-vowel syllables are much rarer than other types, viz., the three patterns already mentioned in 2.1.2.2.2. (CVV± V/?, CVVCV±? and CV?V±V/?); (b) forms that do involve a succession of two two-vowel syllables usually are of the sort with a diphthong in both syllables (e.g., vēīyēī hominy, and ndéī?yèì? peach); (c) forms involving a succession of two one-vowel syllables in the penult and ultima—except for CV?V forms—are extremely rare, but apparently exist (e.g., hīīvā yává cave, tāvā much) as reduced variants of CVVCV forms (e.g., tāāvā much in slower speech); (d) a few forms of CVCVV pattern exist and possibly arose by fusion of some initial CV-element to a following CVV.

C allows a somewhat more free distribution of nasalized vowels than either M or T—both of which limit their occurrence to final syllables except that ultimate and penultimate syllables separated only by ? or h may both be nasalized. In C not only may the vowel or vowels of a penultimate syllable be nasalized in this circumstance, but in addition the vowels of the penultimate syllable of a CVVCV form may be nasalized under the following conditions: (a) when the vowel of the ultima is nasalized the vowels of the penult are also nasalized if (?) m, (?) n, or (?) y separate the two syllables; (b) when the vowel of the ultima is not nasalized and when (?) m, (?) n, (?) y or nd separate the ultima from the penult, the vowels of the penult are nasalized in some words but not nasalized in others. In brief, taking m as a symbol for medial nasal, y or nd (in situation (b) above) plus or minus accompanying ?, the situation may be formulaically represented as follows: (a) CV̨V̨mV̨, and (b) CVVmV, CV̨V̨mV. A person with a first-hand acquaintance with C might perhaps uncover some exceptions to these statements, but they cover all the data available to me at present. An aberrant exception or two—if existent—would not destroy the significance of these

quasi-universal restrictions on nasal vowels for comparative purposes. Undoubtedly they represent something of historical importance in early C or in PMx itself. These considerations are discussed in 2.2.4.3.4.

2.2.2.3. In Trique. But one vowel quality occurs to a syllable; two vowel qualities determine two syllables. Vowels in final syllables are phonetically lengthened if the syllable is not closed by ? or h. While this sub-phonemic lengthening is as long as that characterizing a CVV unit in M or C, it neither patterns in T as two syllables nor as a geminate cluster, but is an entirely automatic feature. A final syllable may be interrupted by ? or h; in spite of the intrusive consonant and in spite of the fact that such a CV?V or CVhV unit is as long phonetically as corresponding disyllabic units in M and C, nevertheless the two phonetic moras bracketing the ? or h are to be regarded as but one phonemic vowel in one syllable. Such a monosyllabic unit is distinguished in my transcription from a disyllabic CV?V sequence (which unlike the monosyllabic sequence may have dissimilar vowels and which regularly lengthens the final vowel as described above) in that the monosyllabic sequence has tone indicated after the entire unit as in we?e^{3} house, while the disyllabic sequence has a tone mark after each vowel symbol as in we^{3}?e^{2} beautiful.

Trique tends towards an alternating CVCV structure but a few vowel sequences occur across syllable boundary, viz., ia, ią, io, iu, ių, ai, aį, au, and eu in such words as ri^{3}a$^{4-3}$ oval, ži^{3}ą^{3} crab, ži^{3}o$^{4-3}$ griddle, ri^{3}uhu$^{5-3}$ reed, ri^{3}ų$^{3-4}$ to measure, a^{3}i^{5}?i^{3}h bitter, ža^{3}į^{3} mosquito, ga^{3}u?u$^{4-3}$ incense-burner, de^{3}u$^{4-3}$ season (Spanish tiempo).

Including the vowel sequences just illustrated, all possible sequences of T vowels in the penult and ultima (with or without intervening consonant) can be summarized as follows: (a) i, a, and u occur before every vowel, nasalized and non-nasalized, including themselves. (b) e occurs only before e, ĭ, a, o, u, ą, and ų. (c) o occurs only before e, o, and ą. (d) Nasalized į, ĭ, ą, and ų occur in penultimate syllables only in repeat sequences with intervening ?. (e) Nasalized ǫ has been recorded only following a or i. (f) Nasalized ę has been recorded in but one native form in which it follows u, but occurs in a loan form following o. Of the above sequences, e-u and o-e are also confined to loans. In connection with the above statements note that ĭ never occurs in non-ultimate syllables, and that ĭį occurs there only in repeat sequence with intervening ?. Not covered in the above statements is the further fact that ʌ, which is never nasalized, occurs in penultimate syllables only in repeat sequences.

2.2.3. PMx vowels relative to M, C, T vowels. The vowel systems of the modern languages are here compared with the reconstructed PMx vowel system and with each other. In comparing these vowel systems it is convenient to refer to only the non-nasalized vowels; corresponding nasalized vowels occur in the various languages as previously summarized.

M, C, T vowel systems resemble the vowel system of PMx in that i, e, a, o, and u are phonemic in all languages and dialects. There has been considerable split and merger of vowels so that a given vowel in a modern language does not necessarily represent a continuation of the corresponding vowel in the vowel system of PMx. Some of the more outstanding developments are (1) C reduces *ï as a phonemic entity; the phoneme is split and merged with C i, e, u, or o according to varying phonological situations. (2) M-J, M have merged PM *ï with i unconditionally and everywhere. (3) M has unconditionally merged PMx *e with i. M-SE e is in many morphemes a reflex of PM and PMx *a. The provenience of M-SM e, is on the whole obscure, aside from a few developments involving PMx *a > e in restricted environments in penultimate syllables. (4) PT *ï has split in T-Ch into ï and ʌ under obscure conditions. Nevertheless, that this development took place seems clear from the almost complementary distribution which still characterizes these two phonemes. As was stated in 2.2.2.3., ʌ is the phoneme occurring characteristically in repeat sequences, while ï (except for the nasalized phoneme) never occurs in non-final syllables in repeat sequences or elsewhere. Furthermore ʌ never occurs nasalized and is extremely restricted in distribution. T-CH ʌ in situations contrasting with ï may have originated in borrowings from another T dialect in which PMx *ï had a consistent phonetic development as [ʌ]—but the latter dialect in turn merged this vowel with one or more other vowel phonemes and eliminated it from its phonemic system. (5) All languages and dialects have eliminated PMx *ɔ. T consistently merges this PMx vowel with T a, while M and C, on the whole, merge this vowel with u or o.

The above developments yield the following vowel systems: (a) five-vowel systems in M-J, M, in C, and in T outside of T-Ch, viz., vowels i, e, a, o, u. (2) Six-vowel systems in M-SM, SE by virtue of the occurrence of a further vowel ï. (3) A seven-vowel system in T-Ch, by virtue of the fact that T-Ch has both ï and ʌ in addition to the vowels mentioned in (a). It is probable that PM and PT had six vowel systems—a system reduced to five by internal developments in certain M dialects, but increased to seven in T-Ch by split of *ï. PMx, by comparison, was characterized by a seven-vowel system.

2.2.4. Probable phonetic nature of PMx vowels.

2.2.4.1. Vowels *i, *e, *a, *o, and *u probably had much the same quality as the corresponding phonemes in the modern languages. There was a lowered and more open allophone of *e in certain situations. PMx *ĭ was either a back or central unrounded vowel with possibly a lowered and central allophone in some situations.

2.2.4.2. Regarding the phonetic quality of the PMx phoneme here symbolized as *ɔ there is more uncertainty due to the circumstances that this phoneme has everywhere been eliminated as a distinct entity by various sorts of mergers. In general, *ɔ seems to have been a back vowel; it gives M, C o or u in most situations. Furthermore, the uniform merger of this vowel with T a makes it likely that the general articulatory range of *ɔ was contiguous to that of *a. It is therefore plausible that the reconstruction as some sort of low, back rounded vowel is not an unfortunate choice. It could be argued, however, that this phoneme was some type of central or back mid unrounded vowel, i.e., a lowered vowel similar in general type to *ĭ. The best arguments in favor of such an hypothesis would be those based on the parallelism in a few situations between reflexes of PMx *ĭ and what we have reconstructed as *ɔ: (a) following a nasal consonant both *ĭ and *ɔ do not give contrasting nasalized vs. non-nasalized reflexes in M, C, T, according to presence or absence of *-m; while other vowels occurring with *-m do; these two PMx vowels may, therefore, have been somewhat similar in quality. (b) Both *ĭ and *ɔ give C i following *w.

The PMx vowel system could be therefore schematized in two alternative ways—depending on what phonetic qualities we posit in the vowel just discussed. In schema (1) below *ɔ is considered to be a low, back rounded vowel; in schema (2) this vowel, symbolized *ë is considered to be a mid, central or back unrounded vowel:

(1)				(2)			
	*i	*ĭ	*u		*i	*ĭ	*u
	*e		*o		*e	*ë	*o
	*a		*ɔ			*a	

2.2.4.3. Post-vocalic PMx *-m.

2.2.4.3.1. It remains to discuss *-m which I posit as the source of M, C, T nasalized vowels. Of first concern here is to present my reasons for reconstructing any sort of final nasal consonant rather than nasalized vowels. One such reason has already been implied: as before mentioned in several places, except for the peculiar occurrence of C forms of general type CV̨V̨mV, vowel nasalization is either a feature of the final syllable or clearly a secondary development in a non-final syllable consequent upon vowel nasalization

in the final syllable; it is as if the nasal influence spreads from the end. To this consideration it is possible to add another: the occurrence of reflexes with nasal timbre is in many sets a sporadic, random, phenomenon which has led me to posit some sort of postposed morpheme or morphophonemic alternation in PMx itself. By positing a final nasal suffixal or enclitic element occurring with some frequency in PMx, it is possible to explain these inconsistencies in terms of haphazard survival of reflexes of forms with the final nasal versus forms without it. Furthermore, the projected final nasal is relevant, not only here in regard to the provenience of nasalized vowels, but in regard to the origin of the PMx prenasalized stops and *ñ; in regard to the survival in C of such forms as dāĩ-nkũúvĩ rain water vs. dą̃ą̃ drops (45); and in regard to the occurrence in M of such dialect variants as kų̃ų̀ vs. kumi four (in that the latter may be regarded as PM *kum + analogically added -i from M numerals 'two' and 'three') (155). In brief, the final nasal as origin of M, C, T nasalized vowels fits into a broader framework as an item of considerable pertinence. Lastly, however, A has direct corroboration of our hypothesis in that it actually has -am in certain cognates corresponding to M, C, T cognates reconstructed with PMx *am and *ɔm.

2.2.4.3.2. A second concern relative to the posited *-m is the consideration as to whether the final nasal was *-m, *-n, or even *-m/*-n. The last possibility may be disposed of first; for, in spite of the fact that *m varied to *n in word-medial (thus giving rise to the series of prenasalized consonants and *ñ), there is nothing to indicate that more than one nasal consonant occurred before space. This narrows the choice to one or the other of these consonants. Here again the witness of A is of primary importance in that A has final m but no final n. Moreover, there are various developments in M, C, and T which make it phonetically plausible that the final nasal consonant was bilabial: (1) There is a general restriction in all three languages that in CVCV forms (CVVCV in C) two bilabial consonants, e.g., k^w...k^w, w...w, k^w...w, m...w, do not occur. If we assume that this restriction partially held in reference to postposed elements as well, it is easier to understand the following developments by assuming *-m than by assuming *-n: (a) the final nasal does not occur after *wV, in basic PMx forms (but does occur in a few instances in PMx verb forms bearing initial replacive *w-aspect morpheme, cf. 4.1.2.); (b) a *k^wĩ /*kĩm alternation is indicated in set 76, and a *x^wa/*xam alternation in set 140; (c) the cluster *ʔm varies to *ʔ before *Vm (see 3.1.4.2.). (2) There are certain phonological developments of PMx a followed by the nasal consonant that are more easily rationalized on the assumption that that

consonant was a bilabial: (a) PMx *am>M u or ų after *n and *ñ, and (b) PMx *am > M, T ų after *t (see 3.2.2.3.).

2.2.4.3.3. The sporadic and random nature of nasalized vowel reflexes in M, C, T is seen in the fact that not many sets have consistently nasalized reflexes in all three languages, nor is it possible to group the languages and dialects as to consistent occurrence of such reflexes. This inconsistency is found not only from language to language, but even (in a few sets) in the M dialects themselves. Furthermore, there occur resemblant morphemes, apparently from the same root, but one with nasalized and the other with non-nasalized vowel; these etymological doublets are good evidence for some sort of morphophonemic alternation, suffixation, enclisis, or the like in PMx. Set 10 illustrates well these factors: M-SM has the forms ^{n}dáhí to untie and ^{n}dɻ̀hì̀ wing. C has similar forms ʔtēēčī to loosen and hēèčè wing, arm plus another form nā-ndūūčī to awaken. T has na^{3}čį^{3} to untie, to loosen, du^{3}gwa^{4}či^{3} wing, and na^{3}či^{3} to awaken. I posit for these various derivatives a common root with some such meaning as 'to take up', 'lift' or 'arise'. Notice the inconsistency of nasalized vs. non-nasalized reflex in that M ^{n}dáhí to untie and C ʔtēēčī to loosen with non-nasalized vowels correspond to T na^{3}čį^{3} to untie with nasalized vowel; while, on the other hand, M ^{n}dɻ̀hì̀ wing with nasalized vowels corresponds to C hēēčē and T du^{3}gwa^{4}či^{3} wing with non-nasalized vowel. Furthermore, the existence of both M-SM ^{n}dáhí untie and ^{n}dɻ̀hì̀ wing points out the same inconsistency in M itself. Likewise, in set 7, M-SM, SE have nasal vowel quality, and M-J has non-nasalized vowel quality, while T-Ch has nasal vs. non-nasal quality in some resemblant morphemes: M-SM, SE kāšį̄, M-J kaši to nurse; T di^{3}ci^{3} breast, gu^{3}ci^{3} to nurse, cį^{3}, ri^{3}cį^{3} a drop of.

2.2.4.3.4. There is some evidence that the order of disappearance of the final nasal consonant was (1) first in PT, (2) somewhat later in PM, and (3) comparatively late in C with (4) survival in certain phonological situations until the present day in A. In T, there is no evidence anywhere of the survival of *-m. There is, however, evidence that phonemic vowel nasalization—consequent on the early loss of *-m—continued as a living part of the grammatical structure of early T: e.g., in set 77, T has the non-nasalized form kǐhǐ^{3} mountain, and the nasalized form da^{3}kį̈$^{2-1}$ hill of corn, nose alongside another nasalized form da^{3}ką^{3} slope, mountain-spur—all apparently from the same root. (There is evidence in the C cognates that the assumption of such a range of meaning is not gratuitous). The two nasalized reflexes in T suggest that one—probably the latter—reflects a PMx feature while the other is a development in PT. There are, furthermore, sets in which T has apparently independently nasalized certain vowels after retained ʔm, since in late PMx *ʔm

> *ʔ before *-Vm. Vowel nasalization still survives as a grammatical category in T in that there is a formal third person semi-fused enclitic which adds a mora of length to preceding stem vowel plus nasal quality, e.g., ra^{3}ʔa^{3} her hand (informal) but ra^{3}ʔa̰^{3}+a̰^{3} her hand (formal).

There is some evidence for survival of final *-m in PM in the M-J, M form kumi four already mentioned (see 2.2.4.3.1.; set 155). Also M-J ^{n}di-kumi onion in set 80 may preserve the second alternate of some PMx *k^{w}ï /*kïm form, with addition in M of vowel -i and consequent preservation of the nasal. The M evidence in regard to PM *-m is slight, but it is more than is found in T, where no such examples of 'fossilized' *-m are found at all.

In C there is solid evidence for survival of PMx final nasal but *-m > *-n surviving as such until comparatively recent times. The form dāī-nkūúvī rain-drops vs. dą̰ą̰ drops seems to indicate that at some period in C, final *-n was dropped before space, but preserved medial in the stress-group before at least some consonants. Davis and Walker state that this example illustrates a regular morphophonemic alternation: 'When the prior form of the compound ends in a nasalized vowel or vowels and the second form has an initial stop, the nasalization is lost, and n is developed.' (CP 145).[3] Nevertheless, the examples of this morphophonemic alternation are few in nouns (three examples in my word lists) and it does not always seem to happen in 'compound' verbs. The C kūù+ntúúmì 'four bits', i.e. fifty centavos (23) is of some interest here in that túúmè is an early Spanish borrowing (tome) in C from about three or four centuries ago. At the time of the composition of the phrase 'four bits' —somewhere in this comparatively recent period, the C word for 'four' still bore a final nasal in some contexts (not in merely 'fossilized' phrases) so that n was added to the Spanish loan with initial t from preceding kūù(n). Verb 'compounds' in which the addition of n does not take place (e.g. ī-dą̰ą́-kāànì-dē̄ he will hurry) probably represent formations of a still more recent date—after the final *-n ceased to occur freely in C contexts but was restricted to 'fossilized' phrases.

C forms with nasalized vowel in non-final syllable of forms of general type CV̰V̰mV structure remain somewhat problematical. Were they clearly C formations, it would be easy to explain their occurrence on the grounds of late survival of C *-n. But in the C of these sets in question the penultimate syllable seems to construct regularly enough. Therefore, it seems probable that the penultimate nasalization in such forms is some sort of grammatical development in earlier C. Note, for example, the following: (59) kṵṵ́ná to take a bath vs. kā-ʔkúúná to bathe (someone): here the penultimate syllable reconstructs regularly as *k^{w}a- in M, C, T aside from the penultimate nasalization in the first C form. Similarly in

from the penultimate nasalization in the first C form. Similarly in set 165 the second C form in ʔyáánà dog vs. ʔyú̱ú̱nà fox correlates with M cognate witnessing to *yu- and a T cognate witnessing to *tu- (regular PMx *y/*t alternation cf. 4.1.1.1.); the vowel of the first C form as well as the nasalization in the second form possibly reflect a C development.

NOTES

1. Needless to say, here as in 2.1.2., 2.2.1. and 2.2.2., for the M and C, I am dependent upon the published articles of my colleagues who have investigated these languages (especially AOMT, GPPA, CTMTS and CP).

2. I have assumed in this study that such C diphthongization does not reflect a PMx vowel cluster. Rather: (a) Some instances of C diphthongization are resultant on loss of PMx intervocalic *y before C i (sets 7 and 49 in which PMx *Cayim >C Cai). (b) Other instances of C diphthongization are resultant on reduplication of *ya or *ye with diphthongization of the penultimate vowel of the reduplicated form and with subsequent spread of the diphthongization to the ultima—provided that that syllable were of CVV pattern. Thus in 176 *ʔyaaya? >ʔyaiya?, while in 191 *i-yeiyee >i-yeiyei. There are two problematical cases of diphthongization in CVV forms (142, 279).

3. On the basis of this data given in CP, Eric Hamp in an unpublished paper ('Cuicatec Phonology: An Historical Note') posited final *n/*m (from earlier *-m) independently of me and about the same time as my own research. In the same paper he posited, however, a final *-k as well. The latter seems to me to be extremely implausible in that no sort of final stop except *ʔ seems to reconstruct in PMx or in an earlier stage of any daughter language.

3. Phonological developments in reconstructed ultimate syllables

3.0. Reflexes of PMx segmental phonemes in reconstructed ultimate syllables are discussed here in some detail. Discussion of PMx glottal stop is postponed until section 5 where it is treated at length. In citing examples in this section, M-SM, SE dialect evidence is summarized simply by citing the M-SM form whenever the forms in the two dialects diverge only by tone.

3.1. PMx consonants in ultimate syllables.

3.1.1. Stops.

3.1.1.0. PMx stops *t, *k, *k^{w}, are relatively more frequent before proto central and back vowels than before proto front vowels in reconstructed ultimas. No examples occur in our present array of cognates for *t before *i in reconstructed ultimas, and but one example occurs for *t before *e in this position. Similarly, only one such example occurs of *k before *i; there are no such examples for *k before *e. Likewise, but one example occurs in reconstructed ultimas of *k^{w} before a proto front vowel—in this case *i. PMx *k^{w} is further restricted in that it does not occur before proto back vowels, *ɔ, *o, and *u in reconstructed ultimas, nor before the latter two vowels in any phonological situation.

3.1.1.1. With the following exceptions, ultimate *t has reflex t in M, C, and č in T: (1) *te>či in M-SM, SE. (2) *ta>ča in M-SM following M u or i in the penultimate. (3) *tu>či in M-SM, SE following M u in the penultimate.

The following sets illustrate consistent reflex t in M, C; and č in T: (105) M-SM, SE, J kātā; C kaatā; T (g)a^{3}ča$^{2-1}$ to sing. (194) M-SM sčítú, M-SE skútú, M-J sa-kutu to fill; C dā-kūùtú to fill, dīītū full; T ni^{4}ča^{3} full, (g)a^{3}ča^{3} to fill. (234) M-SM, SE yūtù; C ī-ʔyúútù tumpline; T ži^{3}čoʔo$^{4-3}$ the little straw mat on the tumpline.

These further sets illustrate the palatalized reflex in M-SM, SE as summarized in the three exceptions stated above: (50, *te) M-SM, SE (kə̀ò) yúčí alligator; C ʔyáátế lizard. (108, *ta ff. M-SM u) M-SM yùčā, M-SE yùtē river; T-Ch ča$^{1-2}$ valley, canyon, T-Co čaʔa river. (109, *ta ff. M-SM i) M-SM hīčá, M-SE hítế wide; C dā-ʔk^{w}ɪ̀ɪ̀tā grow; T ga^{5}čaʔa$^{5-3}$ wide. (264, *tu ff. M-SM, SE u) M-SM SE yūčī powder, M-J, M yuti powder, sand; C (yą̄ʔą́) ndūùtèʔ sand;

T $ču^{3-4-3}$ powder, $(yo^{3}ʔo^{2-1})ču^{4}$ sand. For the last set there also exists M-SM, SE forms illustrating the regular t reflex in words in which i rather than u precedes *tu: ĩĩtĩ́ sand.

3.1.1.2. PMx ultimate *k has uniform k reflex in M; is palatalized to C č before *i and *ĭ (no examples before other proto front vowels), but elsewhere becomes C k; and has reflex k in T except under the following special conditions: (1) PT *uka > ukwa. (2) PT $*kaka^{1}ʔ$ and $*kaką^{1}ʔ$ resulted in the palatalization of the medial consonant to č with accompanying effects on the vowels. (3) PT *k is weakened to g in certain clitic or quasi-clitic morphemes that presumably occurred in positions of relatively less stress in the PMx stress-group. This latter development is the regular treatment of *k in T penultimate syllables (4.2.1.2.).

In the following sets the reflexes of *k are 'regular', i.e., uncomplicated by the special factors just enumerated in reference to T: (1) C tééčé; T $ri^{3}ki^{2-3}$ to give. (70) M-SM, SE yĩkĩ́; C ʔyūūčì ʔ cubit. (74) M-SM yĩkĩ, M-SE yĩ̄kĩ̄ bone, horn, shell; T $zi^{3}kĭ^{2}h$ shell (of an egg). (118) M-SM, SE tākà; C ʔdáákà; T zi^{3} $-ga^{5}ka^{5}ʔ$ bird's nest. (238), M-SM, SE, J ʔōkò; C ndĩ̄ĩkū; T-Ch ko^{4}, T-Co iko twenty. (271) M-SM ʔí-sĩ́kĩ́, M-SE ká-sĩ́kĩ́ to play; C nā-dà-kùùkū to adorn; T $du^{3}ku^{3-4}$ to play, $zdu^{3}ku^{4-3}$ necklace.

In the following sets PT *uka > ukwa: (122) M-SM tī-yáká, čáká, M-SE čàká, M-J tyaka, M-M tyaka; C ʔyāàkà; T $žu^{3}kwaha^{3}$ fish. (185) M-SM tī-yókó, čókó, M-J tyoko ant; C ʔĩĩkō louse, ʔyāākō fly; T $žu^{3}$-kwa^{3} ant.

The following sets illustrate the special palatalization of *k in T according to exception (2) stated three paragraphs above: (123) M-SM, SE, J, M, kākā; C kááká; T (g)$a^{3}če^{2-1}$ walk. (In this set PMx $*ka^{2}ʔka^{1}$—a sandhi variant of a form $*ka^{2}ʔka^{2}$—gives PT $*ka^{2}ka^{1}ʔ > ga^{3}če^{2-1}$). (126) M-SM, SE kāką̀, M-J M ^{n}daka; C kāākā, ndííká; T (g)$a^{3}čį^{2-1}$ to ask for. (The inconsistencies in nasalized vs. non-nasalized vowel are typical of ultimate syllables; see 3.2.2. In this set PMx $*ka^{2}ʔka^{1}m$—a sandhi variant of a form $*ka^{2}ʔka^{4}m$—gives PT $ka^{2}ką^{1}ʔ > ga^{3}čį^{2-1}$).

In the following sets *k is weakened to g under the special conditions stated above. In the first of these sets *k is weakened to g in M-SM, SE as well. This unique development in M accounts for the only occurrence of the phoneme g in the M data available to me aside from Spanish loans. (125) M-SM, SE, + ga, M-J +ka; C +kā; T $ga^{5}ʔ$ (a prefinal particle in T occurring in a position of little or no phonetic stress) more. (124) M-SM, SE, J kàā iron, bell; C kūù bell; T $ga^{3}ga ʔa^{3}$ metal, bell, $ga^{3}ʔ$ hour of day (weakly stressed in such phrases as $ga^{3}ʔ$-$ʔngo^{4-3}$ one o'clock). $du^{3}kwa^{2}$ $-ga ʔa^{3}$ jail, i.e.,

'ironhouse' (with -ga?a^{3} more weakly stressed because of higher tone on preceding syllable). In this last set *k may have been weakened to g in positions of weakened stress, with analogical extension to all forms of the morpheme. Possibly the popularization of the form in g- as well as the T ga- reduplication may have been partially a mechanism to avoid homonymity with ka?a^{3} torch, candle.

3.1.1.3. PMx ultimate *k^{w} has undergone a variety of conditioned sound changes in all three languages. In both M and C a proto front vowel (only *i and *ĩ in our data) is lost following *k^{w}, and the labial component of that stop is vocalized to u (u/o in C). However, in M, *k^{w} followed by a or ą is variously treated according to whether it is preceded by M a, u, ĩ or i, or space. Specifically: (a) PM *ak^{w}a >ak^{w}a; but (b) PM *uk^{w}a or *uk^{w}ą >uku or ukų, i.e., the vowel is lost and the labial component is vocalized in the same manner in which *k^{w} followed by front vowel is regularly treated; (c) PM *ik^{w}a or *ĩk^{w}a >ika or ĩka, i.e., the labial component is lost; (d) PM *k^{w}ą >k^{w}ą in M CV?V couplets but becomes ką—with loss of labial component—in M CVV couplets. In C, PC *k^{w}a and *k^{w}ą are retained after vowel or ?, but PC *k^{w}a and *k^{w}ą >ka and ką in CV?V forms, but become kuu and kųų in CVV forms (the C data are, however, scanty at this point). T retains *k^{w} as cluster kw except that *k^{w}ĩ >T kĩ. In T monosyllabic verbs the phonological development of *k^{w} has been obscured by an analogical reshaping of PT *k and *kw (<*k and *k^{w}) to conform to the g-/gV- aspectual prefix (which began as a regular reflex of *k and *k^{w} in penultimate syllables); some such verbs show a g/gw or g/w alternation (4.1.2.2.3.).

Sets illustrating *k^{w} before proto vowels *i and *ĩ follow: (3) M-SM čɪ-súkɥ̨, M-SE čū-súkɥ̨, M-J ti-sukų; C kwāàkù to wrap up, to wrap around; T na^{3}kwi$^{2-3}$ to wind up, to coil up (oneself). (79) M-SM, SE, J ?ĩkū; C ?ĩĩkò; T gu^{3}kĩ^{3} yesterday. Sets illustrating the varied developments of *k^{w} before proto vowel *a follow: (127) M-SM, SE lāk^{w}ā, M-J ^{n}dak^{w}a, M-M dak^{w}a; C yāākwā? pus; T kwe^{3}h pus, la^{3}kwe^{3}h mucus. (128) M-SM, SE yūkù bush, plant, shrub; C kūū (dĩyúú?nɥ̨?) river algae; T kwehe^{3} edible herbs. (129) M-SM hīkà; C tĩĩkwà thorax; T ži^{3}ru^{4}kwa^{4} rib. (132) M-SM, SE yūkɥ̨; T du^{3}kwą$^{1-2}$ row, furrow. (133) M-SM, SE, J, M k^{w}ą̃?ą̀; C ką̃?ą̀ T gą^{3}?ą$^{3-4}$h/wą^{3}?ą$^{3-4}$h to go. (134) M-SM, SE, J, M ką̃ą̀; C kwą̃ą̃ to pierce, make a hole in; T gą$^{2-1}$/wą$^{2-1}$ to dig.

3.1.2. Spirants. Of the three PMx spirants, *θ, *x, *x^{w}, the latter two do not occur before proto back vowels, *ɔ, *o, and *u in ultimate syllables, nor before *o and *u in any position.

3.1.2.1. PMx ultimate *θ has uniform reflex d in C, but divergent reflexes in M and T according to whether it is followed by a proto

back or central vowel. Thus M has reflex š before *i, *e, *ĩ, but s before *a, *ɔ, and *o—with š/s before *ĩm under obscure conditions.[1] Similarly T has reflex c before *i and *ĩ, (but no data for *θe in T), and reflex t before *a, *ɔ, and *o.

The following sets illustrate *θ before front vowels—including *ĩ: (5) M-SM, SE, J, M vĩšĩ̀ sweet, ⁿdùšī honey; C nā-dī?ī honey; T zi^{3}ci?i$^{4-3}$ candy, ga^{3}ci?i$^{4-3}$ honey. (7) M-SM, SE kāšį̄, M-J kaši to nurse; T di^{3}ci^{3} breast, (g) u^{3}ci^{3} to nurse. (51) M-SM šīĩ̀, M-SE šīšī; C dūūdē aunt. (81) M-SM ⁿdĩ̄šĩ̀, M-SE, J ⁿdīšī cane-whiskey; C nā-dí?í; T di^{3}ci$^{3-5}$?/ci?i^{3} cactus-beer. (84) M-SM kāšį̄ to press, to chew, kʷàšį̄ to press, to nail, kĩ̄sĩ̄ to tremble, quiver (with similar forms in M-SE, J); C ?kāādì to shake something; T (g) a^{3}cĩ^{3}h to touch, handle.

Sets illustrative of *θ before *a, *ɔ, and *o now follow: (135) M-SM tĩ̄-sāà, M-SE sāā; C ?yáádá; T ža^{3}taha$^{4-3}$ bird. (207) M-SM, SE, J ⁿdūsù tone, voice; C ndūūdū word; T (ga^{3}) ta$^{3-4}$h to say. (248) M-SM, SE, J kūsù; C kū-yààdō; T (g) a^{3}to$^{3-4}$h to sleep.

3.1.2.2. PMx ultimate *x gives uniform reflex h in M-SM, SE, but č in M-J (and possibly š in M-M, but the data available to me are scanty). In T, *x gives č before proto front vowels (*i and *e), but k before proto central vowels (*ĩ and *a), with the exception that in one set (141) *xa?a > T ambisyllabic ži?i—with the T reflex now occurring in the penultimate syllable (cf. 4.2.2.2.). In C, the usual reflex is č; this is clearly the case before proto vowels *i and *ĩ. There is possibly a C reflex k before proto vowel *a, but the C data are scanty at this point.

Sets illustrative of PMx *x before proto front vowels (exclusive of *ĩ) now follow: (9) M-SM, SE kìhī fever; C dà-kààčĩ̀ to boil, ?yūūčī to fry; T ga^{3}či?i$^{4-3}$ fever. (10) M-SM ⁿdį̄hį̀, M-SE ⁿdį̄hę̀, M-J ⁿdičį wing; C hēèčè wing, arm; T du^{3}gwa^{4}či^{3} wing. (52) M-SM ⁿdàhī; T (g) u^{3}če$^{3-4}$ to be wet.

Illustrative sets follow for *x before proto central vowels—including *ĩ, before which *x splits up differently in C and T: (85) M-SM yūhą̄, M-SE ñūhę̄, M-M yušą; C yāàčè; T da^{3}kį̄$^{3-4}$h/kį̄hį̄^{3} dough. (139) M-SM háá, M-SE hēé, M-J čaa; T na^{5}ka$^{5-3}$ new. (141) M-SM hā?à, M-SE hē?è, M-J ča?a; C kā?ā; T ži^{3}?i^{2} foot. (140) M-SM ⁿdīhą̀, M-SE ⁿdīhę̀, M-J ⁿdiča, M-M ⁿdi-šąą; C ndāākū?; T da^{3}ką$^{3-4}$h/ką^{3}h sandals.

3.1.2.3. PMx ultimate *xʷ gives reflex h in M-SM, SE and č in M-J preceding proto front vowel (inclusive of *ĩ). Preceding *a, the M reflex is kʷ after vowel but v in CVV forms. For C the data are scanty but the reflex is apparently ku (loss of vowel with vocalization of labial component) or v—with the former occurring before

*i and the latter occurring before *é (which has C reflex a in most situations). Before *a, the C reflex is apparently ku after vowel but v in CVV forms—a development parallel to that just mentioned for M. T gives uniform reflex gw except that the labial component is dropped before *ĩ.

Illustrative sets follow: (14) C (kūūvē) ndúúkù to be joined; T du^3-gwi^{3-4}? together with, companion. (15) M-SM, SE káhí, M-J kačį clear, clearly; T gwi^5? readily, quickly. (54) M-SM, SE kàhĩ, M-J kači; C ndāāvā; T na^3gwi^{3-4} to choose. (87) M-SM, SE kāhį̃, M-J kačį warm, damp; T $gį^5$ warm. (142) M-SM, SE yák^{w}á crooked; T du^3gwa^{3-4}? to turn or to twist down. (143) M-SM, SE, J kū-vāà to make an uproar, M-SM, SE vāà noisy; C (kūūvē) váá make an uproar, čī-ʔāākū a sound, kwāākū to weep; T (g) a^3gwa^2h to scream, bellow, $du^3gwe?e^3$ to weep.

3.1.3. Prenasalized stops.

3.1.3.0. Of these PMx consonants, only ultimate *^{n}d is relatively unrestricted in distribution. In our present array of cognates, ultimate *^{n}g occurs only before proto vowels *a, *ɔ, and *o, while ultimate *^{n}g^w occurs only before *ĩ, and *a, and *ɔ. I discuss here also an anomalous cluster *tn which gives characteristic reflexes in M and T (see 4.2.7.1. for discussion of this cluster in penultimate syllables) in sets of which the C witnesses to ultimate *^{n}d.

3.1.3.1. PMx ultimate *^{n}d is subject to a variety of conditioned sound changes. (a) In M there is a consistent reflex ^{n}d in CVV and CVʔV couplets (presumably <PMx *CV and *CVʔV forms, respectively). In ^{n}daa forms recently fused with preceding CV- element the reflexes are ^{n}ǰ, ^{n}d, ^{n}d for M-SM, SE, and J respectively. In CVʔCV couplets (<*CVʔCV(ʔ)) the ultimate syllable reflex is ^{n}d in the M dialects when this phoneme precedes reflex of *ĩ; and ^{n}ǰ, ^{n}d, ^{n}d in M-SM, SE J when this phoneme precedes reflex of *a. In CVCV couplets the ultimate syllable reflexes of *^{n}d are č, č, t in M-SM, SE, J. (b) C likewise has reflex nd in CVV and CVVʔV forms—except when the following C vowel is nasalized in which case the reflex is n. The latter reflex is regular for ultimate syllables in CVVCV forms. One CVVCV form in which there is an ^{n}d reflex represents a recent fusion of a C auxiliary verb with a former CVV form in which ^{n}d occurred as the regular reflex (Set 145 cited two paragraphs below). (c) There is a T n reflex occurring quite regularly in ultimate syllables (with strengthening of PT n >n• on loss of penultimate syllable). There is also a possible T d reflex for PMx *^{n}dV and *^{n}dVʔV forms. While the latter is attested in sets 148, 149, 249, and 251, in all these sets (considering the first two to be either from the same PMx root or from closely related roots) there is a d/y alternation in the T possessed vs. unpossessed forms. It is therefore possible that T d is an

analogical development involving *θ in these sets—specifically a development of *θ >PT t by regular sound change followed by analogical lenition of *t >d. In view of the fact that the M and C of these sets witness to *^{n}d this latter hypothesis would make it necessary to assume that PMx *θ/*y/*^{n}d alternation lies back of these sets (4.1.1.2.); but, while *^{n}d figures in such alternations in penultimate syllables there is no solid evidence for *^{n}d alternating with *θ and *y in ultimate syllables. As arguments for T d being a reflex of *^{n}d in these sets, note that (a) *^{n}d(V) and *^{n}d(V?V) >T d would parallel the M and C reflexes ^{n}d from PMx forms with these structures. (b) A split of PMx *^{n}d into T reflexes n and d in ultimate syllables would parallel the development in penultimate syllables where such a split surely took place (penultimate *^{n}d >T n before č and velars, and >T d elsewhere 4.2.3.1.). (c) In set 149 of the related 148 and 149 sets, there is C witness to *t; if, therefore, *^{n}d were posited as source of T d in these sets rather than *θ, we would thereby avoid positing another instance of rare overlap of 'θ' and 't' declensions (4.1.1.5.). I posit, therefore, provenience of T d in these sets from *^{n}d rather than from *θ reshaped by analogical development.

The following sets illustrate M, C, T reflexes of forms presumably harking back to PMx *CV and *CV?V forms (i.e. with CVV and CV?V in M, C; and with CV and CV?V in T). (148) M-SM ^{n}dāà (yáū); C ndáá; T da^{3}?/ya?a^{3} century-plant fiber. (149) M-SM ^{n}dā?ā hand; C tā?ā hand, kū-tā?à to sieze (<PMx *t rather than <*^{n}d; cf. 4.1.1.1.); T rà^{3}?a^{3} hand (with fusion of čV- element in this form), (gi^{3}) da^{3}?a$^{3-4}$ to sieze. (212) M-SM ^{n}dòō to stay, to remain; C kā-ndūù to leave (something); T (g)u^{3}na^{2}h to stay, remain, du^{3}na^{2}h to leave (something). (There was presumably no PMx penultimate syllable in this set. We would, therefore, expect T reflex d rather than n. The T n reflex can, however, be rationalized on the supposition that T fusion of preposed element was earlier than the posited split of ultimate PT *^{n}d >n and d.) (249) M-SM ^{n}dōò; C ndúú; T do$^{3-4}$/yo^{3-4-3} sugar-cane. (251) M-SM ^{n}dō?ò; T do^{2}/yo^{2} tenate (handleless palm-leaf basket).

The following set illustrates M, C, T reflexes identical with those illustrated above, except for M-SM reflex ^{n}ǰ and C ^{n}d; these divergent reflexes presumably reflect late fusions of M and C auxiliary verb to following *^{n}daa: (145) M-SM kū-^{n}ǰāà, ká-^{n}ǰāà, M-SE kō-^{n}dēē; M-J ku^{n}da to be (somewhere); T (ga^{3})n•e^{3} to be (somewhere), to reside, to sit. Notice that in this set fusion in M-J has gone all the way to CVCV.

The following sets illustrate M, C, T reflexes of ultimate *^{n}d in *CV?CV(?) forms: (90) M-SM, SE kā?^{n}dì, M-J ka?^{n}di; C kūùnì; T ga^{3}nï^{3} to explode (for absence of -?- in C, T, see 5.3.1.2. and 5.3.1.3.).

(146) M-SM kā$^{?n}$ǰa, M-SE kā$^{?n}$dē, M-J ka$^{?n}$da to cut; C k^{w}ɛ́ɛ̀$^{?}$ (po), $^{?}$nɛ́ɛ̀$^{?}$ (pp) to break; T (g)a^{3}$^{?}$ne$^{3-5}$$^{?}$ to cut (with loss of PMx penultimate in C).

Finally, the following sets illustrate PMx ultimate *^{n}d in *CVCV forms, which is the most common environment of this phoneme in our data: (16) M-SM, SE tǐčǐ, M-J titi; C nu̱ṳ̱nɛ̄; T ru^{2}ne^{3} avocado. (58) M-SM, SE tāčǐ, M-J tati; C $^{?}$yu̱ú̱ná; T na^{3}ne$^{5-3}$ wind. (60) M-SM, SE kùčī, M-J kuti; C kúúná (dīu̱); T (g)a^{2}ne^{3} to ripen. (144) M-SM ^{n}dūčā, M-SE ^{n}dūtē, M-J ^{n}duta water; C nu̱ṳ̱nɛ̀ water, (tīīvī) nɛ̄ɛ̄ to sprinkle; T da^{3}ne$^{3-4}$/n•e^{3-4-3} water (with indication that PMx *(CV)^{n}d(a) > -č(a), -t(e), -t(a) respectively in M-SM, SE, and J rather than to č, č, t as before other vowels).

3.1.3.2. PMx ultimate *tn > M-SM, J t; M-SE N; and T r.[2] It is not represented in the C of the two sets where it occurs; but rather, typical C reflexes of *^{n}d in *CV(?) and *CV?V forms occur: (150) M-SM tą̄$^{?}$ą̀ to transpire, hā-tą̄$^{?}$ą̀ ($^{?}$īnì) to be pleased with, M-SE Ną̄$^{?}$ą̀ to transpire, hé-Ną̄$^{?}$ą̀-(ni^{3}) to be pleased with, M-J tą$^{?}$ą to transpire, tą$^{?}$ą $^{?}$ini to be pleased with; C nɛ̄$^{?}$ɛ̄ to like; T (gi^{3})rą$^{3-4}$$^{?}$ to fare (well or ill), (g)a^{3}rą$^{3-4}$$^{?}$ (ru^{3}wa$^{2-3}$) to be pleased with. (151) C dà-n$^{?}$dé$^{?}$ē to chew, to dance; T (gi^{3})rą^{2}$^{?}$ą^{5}h to dance.

3.1.3.3. PMx *^{n}g gives M-SM, SE h and M-J č before proto vowel *a, but M k elsewhere (which includes occurrence before proto vowels *o and *ɔ). The C reflex is k before *ɔ; no C cognates have been found for the sets with *^{n}g before proto vowels *a and *o. T has uniform reflex ng. Illustrative sets follow: (152) M-SM ^{n}dīhā, M-SE ^{n}dīhē, M-J ^{n}diča in sincerity; T ža^{5}nga^{5}$^{?}$ truly. (214) M-SM, J k^{w}ākù, M-SE k^{w}ɛ̄kù; T (g)a^{3}$^{?}$nga$^{3-5}$$^{?}$ to laugh. (216) C ndūūkū; T nga^{4} with. (253) M-SM yākù, M-SE hēkū some, a bit of; T $^{?}$ngo^{4} one, ngo^{4}$^{?}$ngo^{4} some.

3.1.3.4. PMx *^{n}g^{w} gives M v after vowel, but ku (with vocalization of labial component) elsewhere. The C reflexes are somewhat similar: when following vowel, there is reflex v; elsewhere there is ku before proto vowel plus *-m, but nku before proto vowel not followed by *-m. Trique tends to eliminate the n component of the PT unit phoneme or cluster. Etymological doublets occur in which T ngw (preserved sporadically in rare dialect forms, place-names, and 'fossilized' constructions) occurs alongside verbs with g/w alternation—harking back to PMx *k- and *w-aspects of the 'w' conjugation (4.1.2.2.3.). Illustrative sets follow: (93) M-SM, SE kīvǐ, M-J kivi day; C hūūvē day; T gwi^{3} day, sun, n•e$^{3-4}$ ra^{3}ngwi^{3} (place-name) 'water of the sun'. (154) M-SM, SE, J ^{n}dāvā; C káávà to jump; T da^{3}ngwe$^{3-4}$h to spring or jump away, w•e^{2}h/gwe^{2}h to jump. (156) M-SM, SE kṳ̄ù, M-J, M kumi; C kṳ̄ù$^{?}$/kṳ̄ṳ̄ four; T gą^{5}$^{?}$ą^{3}h four, but ngwą^{4}$^{?}$ą^{3}h/ngwą^{4}$^{?}$

four more (for M-J, M intervocalic m see 2.2.4.3.1.). (22) M-SM, SE, J kāvà to twist; C kā-nkúú to grind; T du^{3}gwa^{2}h to twist, ga^{2}h/wa^{2}h to grind.

3.1.4. Lateral, nasals, and semi-vowels.

3.1.4.0. T frequently strengthens reflexes l, m, n, w, and y of PMx lateral, nasals and semi-vowels to the corresponding fortis consonant on loss of PMx penultimate syllable or upon loss of penultimate syllable developed in PT itself (cf. 19, 20, 42, 48, 66, 67, 68, 187).

3.1.4.1. PMx *l is of very restricted distribution in that it presumably occurs only before proto vowels *i and *u (but see 2.1.4.4.). There is a uniform reflex l in all three languages. The following sets include all examples of *l in our present array of cognates: (12) M-SM, SE lúlí, M-J lu?lu, lu?u, M-M čili, lo?o; C ?lí̱i̱; T l·i^{3}h little. (236) M-SM, SE vílū; T-Ch ži^{3}lu^3, T-SD l·u^3 cat. (237) M-SM víló little lizard; T ži^{3}lu$^{1-2}$ worm.

3.1.4.2. PMx *m like other PMx labials, does not occur before proto vowels *o and *u. There is a uniform reflex m in all three languages, except that medial cluster of *?m is sometimes reduced to ? before nasalized vowels; this development is regular in M but somewhat sporadic in C and T. It presumably reflects a late PMx alternation in which *?mV +*-m > *?Vm (with loss of first *m) which later became ?ỵ (5.3.1.3.). Irregularities in regard to the ?mV/?ỵ alternation in C and T involve occurrences of ?mỵ in either language. In some such cases the nasalization after ?m is unsupported by parallel nasalizations in the other languages and is perhaps suspect of being a development in that particular language. The final bilabial nasal had been lost, and the nasalized vowels—now phonemic—were becoming less restricted in distribution. Trique has a special reflex ?o of *?ma.

In the following sets either *m occurs or *?m—the latter, however, in sets which presumably do not involve *-m and the special development mentioned above: (20) M-SM, SE ñā?mù, M-J ya?mi; C ?mí̱i̱ sweet potato, tubular root; T du^{3}mi$^{3-5}$?/m·i?i^3 soap-root, soap (C has presumably developed a nasalized vowel; T has shifted *?m > m...?). (158) M-SM hà-ní-čā?mà flattened; C dī̱i̱-sīī?má to flatten; T (gi^3)na^3?mą^3 to cave in, fall down (T has presumably developed a nasalized vowel). (162) M-SM, SE, J máá he, himself, that one; C mą̄ą́ oneself; T mą^3?ą^3 oneself (reconstruct *mam?).

In these sets *?m occurs in sets which involve *-m; wherever ?m is retained in any language, I assume PMx variant *?mV, and where *?m > ?ỵ, I assume PMx variant *?Vm (<early PMx *?mVm): (21) M-SM, SE kā?mū, M-J ka?mi to burn something; C ?kú̱ú̱?mí (po), c?í̱?í̱ (pt) to set fire to; T (g)a^3?mą^3 to get warm,

ną^{3}?ą^{3} to smart, to irritate, ną^{3}?ąhą$^{4-3}$ quicklime (T has developed a nasalized vowel in the first form). (95) M-SM tī-ñì?í, čį̀?į́, M-SE čį̀?į́; M-J ti-ñį?į; C sā-?ī?mà; T-Ch žą^{3}?ą^{3}, T-I žu?ma skunk. (161) M-SM, J, M tą́?ą̄, M-SE Ną́?ą̄ comrade, of the same class, ?ūù t. a pair; C nā̧?ą̀ a pair; T yą^{3}?ą$^{5-3}$ twins, a^{4}mą$^{3-4}$? two—only in the phrase 'two more tortillas' (for T development *?m > m...?, see 5.3.1.3.), nu^{5}gwą^{5}? together with (*numą?> nuwą? > nugwą?, cf. below under *w).

3.1.4.3. PMx *n has uniform reflex n in all languages; illustrative sets follow: (24) M-SM, SE ñānǐ, M-J yani; C ?díínó; T di^{3}nɪ$^{2-1}$ brother of a man. (165) M-SM, SE, J ?īnà dog; C ?yáánà dog, ?yų́ų́nà fox; T žu^{3}ne^{3} fox. (223) M-SM, SE ?īnū, M-J, M šanu; C yúúnǫ́; T n·ąhą^{3} cigarette (probably with tobacco as earlier meaning). There are two sets exhibiting *y-, *n-, *t-, and *tn- alternation in the reconstructed ultima; for discussion of this alternation see 4.1.1.3. The sets follow: (110) M-SM yūnū tree (< *n-), M-SE yūNū tree (< *tn-), M-J yutų tree trunk (< *t-or *tn-); C nǫ́?ǫ́ firewood (< *n-), yǫ́?ǫ́ stick (< *y-); T ži^{3}čų$^{2-1}$ stick, wood, firewood, tree (< *t). (111) M-SM hānù box, hīnù oven, (*n-), M-SE yēNù box, (yāù) ?i^{3}Nù barbecue-pit (< *tn-), M-J čatų box, čitų oven (< *t- or *tn-); T ži^{3}čų$^{2-1}$/čų$^{1-2}$ box, barbecue-pit (< *t-).

3.1.4.4. PMx *ñ has reflex ñ in M, but y in C and T. Medial clusters of *?ñ give M-SM ?, M-SE ?ñ, and M-J ?y. This M ñ ~ C y ~ T y correspondence is partially obscured on the T side by the occurrence of reflexes of PMx *θ- replacive morpheme (with possible original meaning definite > A singular and T possessed) in the T of many sets of which the M and C cognates hark back to forms with *ñ-. There was a PMx *y, *θ, *ñ, *^{n}d penultimate alternation involving this *θ- replacive morpheme (cf. 4.1.1.2.); in ultimate syllables the same alternation occurred except that the alternation did not seem to include *^{n}d- (cf. 3.1.3.1.). Ultimate *θ- became, by regular sound change, T t before central and back vowels, while penultimate *θ- became T d before central or back vowels. PMx *ñ gave regular T reflex y, (merging with reflex of *y) with resultant PT *y/*t alternation in ultimate syllable and PT *y/*d alternation in penultimates. The T t reflex of this replacive morpheme survives in some T forms—especially those which add a fused element in front of this morpheme and thus 'freeze' the construction. In other cases the PT *t /*y and *d/*y alternations survive as d/y in modern T. Presumably this is the result of an analogical leveling of the *t/*y alternation found in ultimate syllables to d/y as found in penultimate syllables. This analogical leveling would parallel the leveling of ultimate PT *k to g- in the aspectual prefix.

At any rate, in spite of the fact that the old PMx *θ- is definitely a PMx morpheme and not simply a PT development (as witnessed by A and several sporadic survivals in M and C), it often happens that in a given set of cognates the M and C forms survive without this morpheme, while the T forms survive only with it. This leads to the apparent, but etymologically spurious correspondence, M ñ ~C y ~T t. In one set the PMx replacive survives in both C and T so that the spurious correspondence M ñ ~C d ~T t results.

In the following sets the ñ ~y ~y correspondence is relatively clear; (99) M-SM, J ñīì, M-SE ñīī; T dą$^{3-4-3}$/yą$^{3-4}$ salt. (100) M-SM, J sà-ñīī, M-SE sàñī; T dą^{2}/yą^{2} corn cob. (172) M-SM, SE, J ñūʔù; C yą́ʔà; T yą^{3}ʔą$^{4-3}$ fire. (170) M-SM ñūù; C yą́à; T ži^{3}ą^{2} village (T regularly drops *y after front vowel i). (176) M-SM kʷīʔà, M-SE hīʔñā to bark, M-J ^{a}daʔyu to yell; C ʔyą́ĭyà ʔ coyote, ʔyą́ĭyà kwáʔā? mountain lion; T ži^{3}ʔyą$^{3-4}$h to bark, ža^{3}ʔyą^{3}h coyote.

In these sets the replacive *θ- morpheme occurs as t in T; this results in the spurious ñ ~y~t correspondence: (97) M-SM ñíñī, M-SE ñīñī; C yǭù; T a^{3}tą$^{4-3}$ hail. (171) M-SM, SE, J, M ʔīñū; C yą́ą́; T tąhą^{3} thorn. Another set, in which the *θ- survives in both C and T illustrates the ñ ~d~t correspondence mentioned above: (277) M-SM tīñí, M-SE Nīñī, M-J tiñi; C ʔyūùdè; T žu^{3}tu$^{4-3}$ mouse.

In still another set there is a spurious correspondence M ñ ~ C t ~T n—which is resultant on a PMx alternation *ñ, *t, *^{n}d witnessed to by the three languages respectively. This is the sole instance of occurrence in an ultimate syllable of the PMx replacive *t- allomorph of *θ-. In penultimate syllables, however, both *t and *θ are frequent variants (4.1.1.1. and 4.1.1.2.). Furthermore, as an example of the 't' declension this set is atypical in that *ñ does not usually figure in this declenison. (178) M-SM kùñū; C yúútà, T nʻe^{3-5-4} meat.

3.1.4.5. PMx *w generally has reflex v in M and C and reflex w in T. However, in M-SM, SE *w is vocalized to M u before *i and *e, and dropped between M u...a when the latter vowel is a reflex of PMx *ɔ. In cluster with *ʔ, PMx *w is treated as above for M-SM, SE with the following minor exceptions: (a) the *w of the cluster is vocalized to u with loss of following vowel in the situation M u...a when the latter vowel is a reflex of *ɔ; (b) the *w of the cluster is lost before *a elsewhere. C has uniform reflex v except that *ʔwa > ʔa under obscure conditions in a few sets. T has reflex w except that PT *w > gw in the situations T žu...we, žu...wi, and ru...wi, while PT *ʔw > ʔ in the situation T a...a when the latter

vowel is a reflex of PMx *ɔ. For apparent inconsistencies in M and T reflexes of *?w vs. *w see 5.6.

In the following sets *w or *?w occurs before *i and *e; the first three sets are without the special complications in T just summarized, while the latter two sets illustrate these developments (42) M-SM, SE ?ūù, M-J, M ?uvi; C ?ūùvè; T w·i^{5}h two, T žu^{5}wi^{5}h twelve. (43) M-SM, SE kūù, M-J kuvi; C ?kūùvè; T (g)a^{3}wi$^{3-5}$? die. (67) M-SM, SE yāù, M-M yavi hole; C hīīvā hole; T du^{3}we$^{3-4}$h/w·ehe cave, cliff. (38) M-SM, SE kū?ù; C kúú?vè; T žu^{3}gwi$^{3-4}$h sister of a woman (T shifted *?wi > *wi? according to 5.3.1.3. In turn, PT *wi? > *wih by regular sound change; *w then > gw according to the above statement). (45) M-SM, SE sāù, M-J savi; C dāī-nkūúvè rain drops, dāāvē thunder; T du^{3}?wi^{3} thunder.

The following sets illustrate *w and *?w before *ī, *a, and *ɔ: (101) M-SM, SE tī?vī, M-J ti?vi to suck, to suck blood, to practice witchcraft; C tīī?vī to suck; T zdu^{3}?waha$^{4-3}$ witchcraft. (103) M-SM, SE tīvī, M-J tivi; C tīīvī to blow. (181) M-SM, SE k^{w}à?ā, M-J ku?va to give; C kā?à to give; tāà?và to send things; T (g)a^{3}-?wi$^{3-5}$? to give. (226) M-SM, SE, J, M yū?ū mouth; C dūūvī mouthful; T du^{3}?wa^{3} mouth. (227) M-SM, SE, J, M ^{n}dā?và; C nā-n?dùùvī; T na^{3}?a$^{3-4}$h to be extinguished (in this and the previous set C shifts the *? to the fore of the word as described in 5.3.1.2.). (188) M-SM ?āñú, M-SE ?ánvá heart; T ru^{3}wa$^{2-3}$ insides of (apparently meant heart before displaced by Spanish loan). The M-SM form of the last set is an aberrant development for which I cannot account at present.

3.1.4.6. PMx *y has reflex y in all three languages except (a) for the loss of *y after immediately preceding vowel i in either M or T; and (b) loss of y before *i in C and T. Here also, in sets involving *y, the PMx replacive morpheme *θ- is preserved in T as d- (in alternation with y). Sets follow: (190) M-SM, SE M yā?ā; C ī-?yāā?; T da^{3}?a^{3}h/ya^{3}?a^{3}h chile pepper. (230) M-SM, SE ^{n}dēyū, M-J ^{n}dayu; T ni^{3}a$^{4-3}$ dinner; (261) M-SM, SE ^{n}dē?yù, M-J ^{n}da?yu mud; T ži^{3}?yo$^{1-2}$ mud hole. (262) M-SM hīð, M-SE hīyð, M-J čiyo; T ži^{3}o$^{4-3}$ comal (the clay griddle for making tortillas). (189) M-SM, SE yáā; C č?īīyā; T ya$^{3-4}$/y·a$^{3-4}$ tongue (y strengthened to y· analogically in some idiolects; there presumably was no PMx or PT penultimate).

3.2. PMx vowels in ultimate syllables.

3.2.1. Non-nasalized reflexes. In citing illustrative sets in this section, the proto consonant reconstructed for a given set will be given immediately following the number of the set in order to

facilitate the correlation of the illustrative sets with the statements of the conditioned sound changes in which the proto consonant preceding the proto vowel plays no inconsequential role.

3.2.1.1. PMx *i has reflex i in M with the exceptions that (a) *i > u in M-SM, SE after *?m when the cluster is retained and (b) *i is lost after *w > u in M-SM, SE. In C *i > e after *w; *i > e/i after *^{n}d; *i > o/u after *n; *i is lost after *x^{w} > ku; and *i > i elsewhere. In T *i > e after *^{n}d; *i > ï after *n; and *i > i elsewhere. The C i/e and o/u reflexes referred to above must be attributed to divergent dialect developments followed by considerable dialect borrowing. Freely varying forms of the same morpheme as well as resemblant morphemes constituting etymological doublets occur in the C data. For example, C nu̱u̱nę̄/nu̱u̱nį̄ bean in set 17 (from a root with ultimate syllable *^{n}di and with nasalization as a C development) illustrates the former; while such divergent C forms as the following in set 26 illustrate the latter: tū-vīīnú to disgust, but (kūūvē) kāà-?vīīnō to be disgusted (from a root with ultimate syllable *ni).

Illustrative sets follow: (8, *x) M-SM ^{n}dīī, M-J kiči, vači to return; C kū-čīī to come; T (g)u^{3}či$^{3-5}$? to arrive. (5, *θ) M-SM ^{n}dùšī; C nā-dī?ī; T ga^{3}ci?i$^{4-3}$ honey. (16, *^{n}d) M-SM tìčī; C nu̱u̱nę̄; T ru^{2}ne^{3} avocado. (42, *w) M-SM ?ūù, M-J ?uvi; C ?ūùvè; T w·i^{5}h two. (14, *x^{w}) C(kūūvē) ndúúkù to be joined; T du^{3}gwi$^{3-4}$? together with, relative. (27, *n) M-SM tī-hání grandchild; C (dāīyā) déénó́ grandson; T (da^{3}?ni$^{2-1}$) zi^{5}?nï^{5} grandchild.

3.2.1.2. PMx *e has reflex i in M except for loss of vowel following *w > u in M-SM, SE. The C reflex is a following *w, *x^{w} and *^{n}d, but e elsewhere. The T reflex is i following *w, but e elsewhere. (59, *^{n}d) M-SM kūčī; C ku̱u̱ná; T (g)a^{3}ne$^{3-4}$ to bathe. (54, *x^{w}) M-SM kàhī; C ndāāvā; T na^{3}gwi$^{3-4}$ to choose. (68, *w) M-SM yūù, M-M yuvii; C hīīvā; T du^{3}we$^{2-1}$/w·e$^{1-2}$ straw mat. (51, *θ) M-SM šīī, M-SE šīšī; C dūūdē aunt. (52, *x) M-SM ^{n}dàhī; T (g)u^{3}če$^{3-4}$ to get wet.

3.2.1.3. PMx *ï has reflexes ï, ï, i, i in M-SM, SE, J, and M respectively—except for loss of vowel following *k^{w} > ku in any dialect. Some sporadic irregularity in regard to M-SM, SE ï vs. i reflex may reflect borrowing from a dialect of the type of M-J. The C reflexes are (1) i following *θ, *^{n}d, and *w, except that (2) uu is the reflex following *^{n}d when the C vowel is a geminate vowel cluster. (3) *i is lost following *k^{w} > C ku. (4) Elsewhere the C reflex is e/i which reflects again separate dialect divergence and dialect borrowing. The T reflexes are (a) i following *t, *θ, and *^{n}g^{w}, (b) a after *w, and (c) ï elsewhere in T-Ch (but i in other T

dialects). (81, *θ) M-SM ⁿdīšì, M-SE, J ⁿdīšī cane-whiskey; C nā-dí?í cactus-beer; T di^{3}ci$^{3-5}$?/ci?i^{3} cactus-beer. (89, *ⁿd) M-SM ⁿdíī completely, M-SM, SE ⁿdī?ī all, finished, M-J ⁿdi?i all, finished; C ndūū all of; T nī^{5}? all. (91, *ⁿd) C nā-?nąą́nī́; T na^{3}?nī^{2}h to open. (101, *w) M-SM, SE tī?vī, M-J ti?vi to suck, to suck blood, to practice witchcraft; C tīī?vī to suck; T zdu^{3}?waha$^{4-3}$ witchcraft. (77, *k^{w}) M-SM, SE, M yūkū mountain; C hīǐkù hill; T kihǐ^{3} mountain. (72, *k) M-SM hīkí, M-SE yīkí, M-J čiki; C ?yūūčē? fist (M-SM form probably reflects a special palatalization following initial h). (73, *k) M-SM yíkí; C ?yūūčǐ? cubit. (74) M-SM yīkī, M-SE yīkī, M-M ?iki bone, shell; T zi^{3}kǐ^{2}h shell (of an egg). (71, *t) M-SM hītì, M-SE yītī; C hēētē; T ži^{3}či$^{3-5}$? intestines. (93, *ⁿg^{w}) M-SM, SE kīvì, M-J kivi; C hūūvē; T gwi^{3} day.

3.2.1.4. PMx *a has reflex a in M-SM, J except for loss of vowel in the former (and in M-SE) following *k^{w} > ku. In M-SE *a is palatalized to e following *x > h, *ⁿg > h, *ⁿd > t, and *ⁿd > d; and after *t with preceding u or i in that dialect. C has reflex a in most situations but a is lost following *x^{w} > C ku. Furthermore, there are special reflexes of *a in C CVV forms: viz. *ka and *k^{w}a > C kuu, while *ⁿda > C ndaa when the vowel timbre is oral, but *ⁿda > C nęę when the vowel is nasalized—presumably as a development in C itself. Similarly, ultimate *ⁿda in C CVVCV forms, when nasalized, gives the reflex nį/nę. T likewise has reflex a in most situations, but *a > e in a few special environments, viz. following *ⁿg^{w}, *n, and *ⁿd (the last only when > n, not when > d); in the situations kw...h in T itself; and following the special palatalization of *k > č described in 3.1.1.2. After *w there is T reflex e in the situations: (space)we, (u)?we?/h and (u)gwe(h); but T reflex i in the situations (a)wi, (a)?wi?/h and (u)gwi(?); and T reflex a in the situation (u)wa. After T u?w there occur e, i, e respectively in T-Ch, T-Co, and T-I. A very restricted development is PMx *?ma > T ?o. Finally, PMx *ⁿga?a > T ambisyllabic ži?i.

Sets illustrating these varied developments of PMx *a follow: (139, *x) M-SM háá, M-SE hēé, M-J čaa; T na^{5}ka$^{5-3}$ new. (152, *ⁿg) M-SM ⁿdīhā, M-SE ⁿdīhē, M-J ⁿdiča in sincerity; T ža^{5}nga^{5}? true. (144, *ⁿd) M-SM ⁿdūčā, M-SE ⁿdūtē, M-J ⁿduta water; C nų̨ų̨nę̨/nų̨ų̨nį̨ water, (tīīvī) nę̨ę̨ to sprinkle; T da^{3}ne$^{3-4}$/n·e^{3-4-3} water. (145, *ⁿd) M-SM kū-ⁿǰàà, M-SE kō-ⁿdēē, M-J kuⁿda to be seated; C ?k^{w}īīndì to sit down, kò-nę̨ę̨ to stay; T (ga^{3})n·e^{3} to sit down. (The C has recent fusion of *ⁿdaa with CV-, hence is not representative of normal reflex of *ⁿda in CVVCV.) (108, *t) M-SM yùčā, M-SE yùtē river; T-Ch ča$^{1-2}$ valley. (109, *t) M-SM

hīčá, M-SE hítế wide; C dā-?k^{w}īītà to grow; T ga^{5}ča?a$^{5-3}$ wide. (143, *x^{w}) M-SM vāà noisy, kū-vāà to make an uproar; C čī-?āākū a sound, kwāākū to weep; T (g)a^{3}gwa^{2}h to scream. (124, *k) M-SM kàā metal, bell; C kūù bell; T ga^{3}ga?a^{3} metal. (128, *k^{w}) M-SM, SE yūkù bush, plant, shrub; C kūū-(dīyúú?nų̄?) river algae; T kwehe^{3} herbs. (148, *^{n}d) M-SM, ^{n}dāà (yáū); C ndáá; T da^{3}?/ya?a^{3} fiber of the century plant. (146, *^{n}d) M-SM kā?^{n}jà, M-SE kā?^{n}dē to cut; C kwę̄ę̄?, ?nę̄ę̄? to break; T (g)a^{3}?ne$^{3-5}$? to cut. (154, *^{n}g^{w}) M-SM ^{n}dāvā; C káávà to jump; T da^{3}ngwe$^{3-4}$h to spring away, (g)w•-e^{2}h to jump. (165, *n) M-SM ?īnà dog; C ?yáánà dog; T žu^{3}ne^{3} fox. (123, *k) M-SM kākā; C kááká; T (g)a^{3}če$^{2-1}$ to walk. (180, *w) M-SM yū?à; C ?íívà; T-Ch du^{3}?we$^{3-4}$h/?wehe^{3}, T-Co yu?wih, T-I yu?weh thread. (153, *^{n}g) M-SM kē-há?á, M-SE kē-héé, M-J ke-ča?a; C kū-ñkā?ā; T (g)a^{3}ži?i^{5} to begin.

3.2.1.5. PMx *ɔ has uniform reflex a in T, but varying reflexes in M and C. In M a is the reflex after *w, except that after *?w preceded by M u, the *w is vocalized to u and the proto vowel is lost. In PMx situations *t...? and *k...? the M reflex is ï (>i in M-J, M). In M CVV forms, the reflex is oo. In other situations there is reflex o or u (in accounting for this inconsistency, again I assume separate dialect divergence and dialect borrowing). The C reflexes are: i after *w, uu in CVV forms; and u or o elsewhere.

Sets illustrating these varied developments of PMx *ɔ follow: (226, *w) M-SM yū?ū; C dūūvī; T du^{3}?wa^{3} mouth. (227, *w) M-SM ^{n}dā?và; C nā-n?dùùvī; T na^{3}?a$^{3-4}$h to be extinguished. (197, *t...?) M-SM kīīī to boil; C (kūūvē) kūūtù? to get warm; T (g)u^{3}-yą$^{3-4}$h to boil. (199, *k..?) M-SM ^{n}dīkì; T ni^{5}ka^{5}? short. (195, *t) M-SM tōō; T nga^{3}ča$^{5-3}$a span. (212, *^{n}d) M-SM ^{n}dòō to stay, to remain; C kā-^{n}dūù to leave something; T (g)u^{3}na$^{2-3}$ to stay, du^{3}na$^{2-3}$ to leave something. (217, *^{n}g) M-SM kīkū to sew; C (kā?-mą̄) kwāākū to swear, to testify; T da^{3}?nga?a$^{4-3}$ scar, proof. (219, *^{n}g) M-SM vīkò; T nga^{3} cloud. (200, *k) M-SM čókó ant; C ?īīkō louse, ?yāākō fly; T žu^{3}kwa^{3} ant. (201, *k) M-SM kōò; C kúú; T žu^{3}kwa$^{1-2}$ snake (In this and the previous set *k is labialized in T after T Cu- prefix; see 3.1.1.2.).

3.2.1.6. PMx *o has uniform reflex o in T. In M the most frequent reflex is o or u under obscure conditions which probably again involve the type of dialect borrowing already referred to several times previously (for a possible ï/ɨ reflex after certain nasal consonants see 3.2.2.5.). C presents a similar picture in that there are both o and u reflexes of *o, but the latter is preferred when the C reflex is a geminate vowel, and following *t;

while the former is preferred after *y, *n, or *ñ. There are examples of both o and u reflexes after *k and *θ for which we assume again a situation of dialect borrowing.

Sets illustrating *o follow: (234, *t) M-SM yūtù; C ī-ʔyúútù tumpline; T ži^{3}čoʔo$^{4-3}$ straw mat on the tumpline. (236, *k) M-SM ^{n}dàkū broom; C ndūūkū twig; T koho^{3} plant, bush. (237, *k) M-SM sòkō; C kwīīkō hunger; T zi^{3}-ko$^{4-5}$ stomach. (248, *θ) M-SM kūsù; C kū-yààdō; T (g)a^{3}to$^{3-4}$h to sleep. (246, *θ) C dūùdú fur, feathers, yūùdò (lɪ̨ɪ̨) hair of the head; T to^{3-4-3} fur, feathers. (253, *^{n}g) M-SM yākù some; T ʔngo^{4} one. (260, *y) C ndōōyò; T yoʔo^{3} year. (235, *t) C túú; T čo^{3-5-4} soot. (249, *^{n}d) M-SM ^{n}dōò; C ndúú; T do$^{3-4}$/yo^{3-4-3} sugar cane.

3.2.1.7. PMx *u has reflex u in T with the exception that there is a special reflex ï which occurs only in the situation *ʔn...ʔ (there happen to be no examples of T cognates for *nu except in two sets in which the T reflex is thus bracketed by ʔ). M-SE has reflex ï after *t, *k, and *ñ; ï presumably represents the PM reflex of PMx *u in these environments. M-SM reduces this PM *ï to i following *t > č (this particular development is shared by M-SE along with reduction of ï to i following N in that dialect), following *ñ, and following *k when the M k reflex is preceded by hi in that dialect. Thus, PM *ï survives following *t and *k only in certain situations in M-SM. In M-J, M *ï is uniformly reduced to i. Elsewhere, viz. after *l, *n, and *y in our present array of cognates, the M reflex is u for all dialects. One lone instance of o after *l reflects another instance of separate dialect divergence and dialect borrowing—a complication which meets us at almost every turn of the way in discussing o vs. u in M and C, and e vs. i in C. The C data are somewhat scanty for *u; but seem to indicate u after *k, and e after *t and *θ.

Sets illustrating *u follow: (264, *t) M-SM, SE yūčī powder, ñìtī́ sand, M-J, M yuti powder, sand; C (yɪ̨ʔɪ̨́) ndūùtèʔ sand; T ču^{3-4-3} powder. (269, *k) M-SM, SE ^{n}dīkī́, M-J, M ^{n}diki; T ku$^{1-2}$ horn, bone. (270, *k) M-SM hīkì, M-SE yīkì; T zi^{3}ku^{2}h corner. (271, *k) M-SM, SE ʔí-síkī to play; C nā-dà-kùùkū to adorn; T du^{3}-ku$^{3-4}$ to play. (272, *l) M-SM vílū; T ži^{3}lu^{3} cat. (273, *l) M-SM vílǒ little lizard; T ži^{3}lu$^{1-2}$ worm. (274, *n) M-SM kāʔnù to break, to cut; T (g)a^{3}ʔni$^{3-5}$ʔ to cut, to chop. (277, *ñ) M-SM tīñí, M-SE Níñí, M-J tiñi; C ʔyūùdè; T žu^{3}tu$^{4-3}$ mouse (with PMx *θ- in the C and T forms). (278, *y) M-SM tēʔyù; T (gi^{3})ri^{3}ʔyu^{3}h to spoil, to rot.

3.2.2. Nasalized reflexes.

3.2.2.0. It is probable that some PMx roots ended in an inherent

*m, while other roots ending in a vowel, or vowel plus *?, received suffixal (or enclitic) *-m in grammatical construction. The former sort of roots are likely those that survive in our sets with nasalized vowel in all three languages (except for reduction of nasal quality by dissimilation after nasal consonant in certain M couplets), while the latter sort of roots are probably those with randomly distributed nasalization in the three languages. But while this is generally probable, it is nevertheless possible that a given set with M, C, T nasalized vowel may result from PMx root which has happened to survive everywhere only in the form with the postposed *-m. Furthermore, it is possible that a given set with inconsistent CV and CV̨ reflexes in the three languages may reflect an early development in one of the languages according to which a non-nasalized vs. nasalized grammatical alternation was analogically extended to a root basically of the *CVm or even of the *CV variety but not characterized in PMx by this alternation. In brief, there are not many sets in which it is possible to claim with certainty that a PMx *CVm lies back of the nasal reflex in one or more of the languages. It seems that we may consider it certain that such an alternation characterized PMx—since the phenomenon is much too wide-spread and general to be otherwise—without being unduly dogmatic about the status of a particular nasalized reflex in a given instance. In the array of cognates listed in section 7, all reflexes of a given vowel with a given consonant are listed under the schematically arranged reconstructed *CV without attempt to label nasalized vs. non-nasalized reflexes according to origin in PMx vs. origin in an early stage of a given language. Immediately below, however, in the comments here made concerning nasalized reflexes of particular vowels, an attempt is made to distinguish these two chronologically different developments whenever it seems reasonably feasible.

When there is evidence for both *-? and *-m in the same PMx form either *CVm? or *CV?m can be reconstructed, but the former is more probable in that A forms occur with final -m? and final -m?m but not with final -?m. This would indicate that there was a metathesis of PMx postposed *-m with original *-? of the PMx root.

3.2.2.1. Nasalized reflexes of PMx *i are on the whole identical with those already described for this vowel under the non-nasalized reflexes except, of course, for the additional nasal timbre. The T nasalized reflex of PMx *i is ą after *?m. The M nasalized reflex of PMx *i after *k^{w} consists simply in the nasalization of the vocalized labial component of the preceding stop; the PMx vowel as such is lost. Set 10 mentioned under 2.2.4.3.3. is a very probable case of PMx *xi/*xim—since there are etymological doublets of

divergent meanings in both M and T. On the other hand, set 48 in which T has an etymological doublet ga^{3}wi^3 to be (copulative), to become vs. na^{3}wi^3 to terminate, while M and C have cognates with only non-nasalized reflexes very probably reflects a nasalization in PT, since there is no other instance of nasal vowel after *w in our array of cognates (except where *w is itself a replacive morph in the reconstructed verb aspect system) and consequently PMx *-Vm is assumed not to have occurred on basic forms after this consonant. Sets 16 and 17 (with *^{n}di) contain C cognates with nasalized vowel while the M and T cognates have only non-nasalized vowels. Similarly, set 19 (with *li) and set 20 (with *mi) display a nasalized reflex only in C. It is rather plausible that C in these sets has developed the nasalization independently. Illustrative sets follow: (21, *?mi) M-SM, SE kā?mū, M-J ka?mi to burn something; C ?kṵṵ?mí, ?ɻ?ɻ to set fire to; T (g)a^3?mą^3 to get warm, ną^3?ą^3 to be irritated, to smart. (207) M-SM šṳ?ṵ money, bit; T zą^3-?ąhą$^{4-3}$ money, zą hą^3 bit. (3, *k^{w}i) M-SM čī-súkṳ̄ to wrap up, wrap around; C kwāàkù to wrap around; T na^{3}kwi$^{2-3}$ to wind up, coil up. (16, *^{n}di) M-SM tìčī; C nṳ̄ṳ̄nę̄; T ru^{2}ne^3 avocado. (19, *li) M-SM lúlí; C ?lɻ́ɻ́; T l·i^{3}h little.

3.2.2.2. Nasalized reflexes of PMx *ī are, aside from addition of nasal timbre, like those previously described for this vowel except that *ī > T ą after *k when the nasalized reflex harks back to PMx *ïm. After *x the following nasalized reflexes occur: M-SM, M ą, M-SE ę; T ɻ. Notice, by contrast, that the nasalized reflexes after *x^w are less unusual in M: M-SM, SE, J ɻ; C ṳ; T ɻ. After *m and *ñ there appears to have been no nasalized vs. non-nasalized contrast left on disappearance of final *-m following *i in PMx. The vowel *ī was phonetically nasalized in these circumstances because of the preceding nasal consonant whether or not it was followed by a second nasal consonant. A given language may yield either a nasalized or a non-nasalized reflex for *i according to the particular nasal consonant, nevertheless there is no apparent contrast—aside from one set in which the C may have analogically denasalized the vowel with subsequent loss of nasalized alternate. However, whatever may be the provenience of these nasalized reflexes, they are summarized here as follows: In M, *?mï > ?ɻ or ?ɻ with the former under certain conditions in M-SM, SE. In C, *?mï gives ?mą in one set, and ?ma in another—with the latter resulting from the C denasalization posited above; and *ñï gives yṳṳ reflex in CVV forms. In T, *?mï > ?ą or ?mą (for loss of *m see 5.3.1.3.), and *ñï > yą.

Most of the sets involving a nasalized reflex of PMx *ī are

ambiguous as to the choice between PMx *ĭm or nasalization in M, C, or T. Set 104, which seems to reconstruct as *?ĭm (but which involves some apparent phonological difficulties possibly resulting from the fact that the rarity of this ultimate ?V combination does not yield us enough data to study the problem carefully) gives consistently nasalized reflexes in all languages: M-SM ?ḭ̀ḭ̀, M-J ?ḭḭ; C nṵṵ; T-Ch ?ḭ^{4}, T-Co ?ṵ, T-I n·ĭ nine. Set 77 (with *k^{w}ĭ) has a nasalized reflex only in T, but the presence of an etymological doublet pair with two contrasting nasal vowel qualities makes it probable that one is a reflex of PMx *ĭm, while the other is a T development: M-SM yūkū mountain; C hīĭ́kù hill, ?dáá́kó a pile, tíĭ́kó a little hill; T kīhĭ^{3} mountain, da^{3}ką^{3} slope, spur (< PMx *ĭm), da^{3}kḭ$^{2-1}$ hill of corn, nose (nasalization in T itself). Taking the cue from this etymological doublet pair, we can now proceed to identify kḭ^{3} river in set 78 as a T nasalization, but ką$^{3-4-3}$ seeds in set 75, and ką^{3} squash in set 76 as reflexes of PMx *ĭm. In set 76 an aberrant ku reflex in C (which presumably harks back to *k^{w}ĭ rather than to *kī; cf. 77-80) raises the possibility of a late PMx alternation *k^{w}ĭ/kĭm (< earlier *k^{w}ĭm).

The following sets illustrate nasalized reflexes of *ĭ after *x, *x^{w}, and nasal consonants as described at the beginning of the paragraph preceding the one above: (85, *xĭ) M-SM yūhą̄, M-SE ñūhę̄, M-M yušą; C yāàčè; T da^{3}kḭ$^{3-4}$h/kḭhḭ^{3} dough. (87, *x^{w}ĭ) M-SM, SE kāhį̰, M-J kačḭ warm, damp; T gḭ^{5} warm. (88, *x^{w}ĭ) C kṵ́?ṵ́; T zi^{3}gï?ĭ^{3} chicle. (96, *?mĭ) M-SM, SE sḭ̀?ḭ̄, M-J sḭ?ḭ foot; C dḭḭ?mą̄ leg; T da^{3}?mą^{5} leg. (97, *m̃ĭ/*θĭ) M-SM m̃ĭm̃ĭ, M-SE m̃ím̃í; C yṵṵ; T a^{3}tą$^{4-3}$ hail. (99, *m̃ĭ/*θĭ) M-SM m̃ĭĭ, M-SE m̃ḭ̀ḭ̀; T dą$^{3-4}$/yą$^{3-4}$ salt.

3.2.2.3. Nasalized reflexes of PMx *a likewise generally parallel the non-nasalized reflexes of *a. There are, however, certain special developments. (a) After *n and *m̃ in couplets of M CVV and CVCV pattern PMx *am > M u; after these same consonants in couplets of CV?V pattern (with both vowels identical) PMx *am > M ṵ. This is probably a development of PMx and PM *am rather than a latter M vowel nasalization in that the most plausible phonetic rationalization of the rather unusual vowel reflex in M is that it reflects influence of the PMx and PM bilabial nasal. Likewise, the M ?ą < late PMx *?am (< early PMx *?mam) points to a PMx *am rather than to a M vowel nasalization in that loss of *m from *?m cluster is most easily explained by positing such a development (See 3.1.4.2.). There is a special development, late PMx *m̃V?am (< early PMx *m̃V?mam) > M m̃ṵ?ṵ. (b) Other than in the above situation involving *?m, there is no distinction of nasalized

vs. non-nasalized reflexes in M following *m and *y; presumably both PMx *a and *am are merged in M a after these consonants. This fact together with the consideration that even when PMx *am > M u the reflex is not nasalized may indicate that there was a weak sub-phonemic nasalization of a conditioned by the preceding nasal consonant so that loss of following nasal did not leave any contrasting nasal timbre. The rather weak phonetic nature of the nasalization is suggested by the fact that these vowels are merged with the non-nasalized rather than with the nasalized M vowel phonemes. However, with medial -ʔ- in the form the nasalization appeared to have been stronger so that PMx *am has a M reflex which is merged with the nasalized high back vowel, viz., ụ. Notice, finally, that the development after *y remains obscure, since it is difficult to imagine how this particular consonant would result in a neutralization of following nasalized vs. non-nasalized qualities. (c) Following *t, PMx *am > M and T ụ; in this situation final *-m conditions a rounded vowel reflex in T as well as in M.

The developments in the preceding paragraph are such that it is possible to claim with some assurance that the M reflexes in question are derived from PMx *Vm rather than from innovations in M itself. I now list a few nasalized reflexes which, like other nasalized reflexes which involve nothing more drastic than the addition of nasal timbre to reflexes of *a already described, are in many sets difficult to classify as to origin in PMx or in an early stage of one of the three languages: C has a reflex ęę or ę/į after *^{n}d. T has a reflex čį for CV combination *ka in the very special set of circumstances *ka^{2}ka^{1}ʔ; this is parallel to the non-nasalized reflex če in the same circumstances (see 3.1.1.2., 3.2.1.4.). It is of some interest here that A—which we do not regularly cite in this study—preserves am reflex of PMx *am. This witness is crucial, although outside the framework of this study.

In this paragraph I list illustrations for PMx *am after nasal consonant and *y as described two paragraphs above. In these sets it appears probable that the nasalized M vowels or the non-nasalized a or u reflex are developments of PMx *Vm. This fact, along with A am reflex for many of the sets makes it fairly certain that M, C, T nasalized reflexes hark back to PMx *am (166, *nam) M-SM, SE, J nūù face, towards, in front of, place where, time when; C nā-nąą̄ in front of; T yą$^{3-4}$, ri^{3}ą$^{3-4}$ face of, surface of, in front of, place where, time when; A nam (sg) face, edge. (167, *nam?) M-SM, SE, M ñūnū; C yāānà; T n·ą^{3}h net-work bag (C reflex here either bears witness to a PMx *na variant or reflects a denasalization development in that language itself). (170, *ñam) M-SM, SE

J ñūù; C yǫ́ǫ̀; T ži^{3}ą^{2}; A tsham (sg), nham (pl) village; (171, *ñam) M-SM SE, J, M ʔīñū; C yǫ́ǫ́; T tąhą^{3}; A tsiam (sg), niam (pl) thorn. (172, *ña?am) M-SM, SE, J ñų̄ʔų̀; C yǫ́ʔǫ̀; T yą^{3}ʔą$^{4-3}$; A tšam (sg), nam (pl) fire. (161, -*?(m)am) M-SM, tǫ́ʔą̄ comrade, of the same class, ʔūù t. a pair; C nǭʔǫ̀ a pair; T a^{4}mą$^{3-4}$? a couple of, nu^{5}gwa^{5}? together with, yą^{3}ʔą$^{5-3}$ twins. (159, -*?(m)am) M-SM SE, J, M ñų̄ʔų̄ land, soil; C yǫ́ʔǫ̀?; T yo^{3}ʔo$^{1-2}$. (176, -*?ñam?) M-SM k^{w}ī?ǫ̀, M-SE hīʔñā to bark (of a dog), M-J ^{n}daʔyu to yell; C ʔyǫ́ǐyǫ̀? coyote; T (gi^{3})ži^{3}yą$^{3-4}$h to bark, ža^{3}ʔyą^{3}h coyote (the M-J form is obscure). (162, *mamʔ) M-SM, SE, J mǽǽ he, himself, that one; C mą̄ǫ́ oneself; T mą^{3}ʔą^{3} oneself. (193, *ʔyamʔ) M-SM ʔīʔà/ʔīʔyà, +yà god, saint, M-SE yāà; C(tīīlō) ī-hǫ́ʔǫ̀ pre-Columbian stone idols; T yą^{3}ʔąhą$^{4-3}$ god, saint, gi^{3}ʔyąhą$^{4-3}$ holy day. (110, -*n-/*y-/*t-/*tnam) M-SM yūnū, M-SE yūNū tree; M-J yutų tree trunk; C nǫ́ʔǫ́ firewood; yǫ́ʔǫ́ stick; T ži^{3}ču$^{2-1}$/čų^{3} stick, wood, firewood, tree; A tsʔam (sg), nʔam (pl) stick.

The following sets illustrate nasalized reflexes of PMx *a of less certain status historically—although some are quite probably reflexes of PMx *am: (146, *?^{n}da) M-SM kāʔ^{n}ǰà, M-SE kāʔ^{n}dē to cut; C k^{w}ǫ́ǫ̀ʔ, ʔnǫ́ǫ̀ to break; T (g)a^{3}ʔne$^{3-5}$? to cut. (144, *^{n}da) M-SM ^{n}dūčā water; C nų̄ų̀nǫ̀/nų̄ų̀nį̀ water, (tīīvī) nǭǭ to sprinkle, to spatter; T da^{3}ne$^{3-4}$/n·e^{3-4-3} water (in this and the preceding set, the nasalization in the C forms is probably a C innovation). (126, *ka) M-SM kākǫ̀; C kāākā to ask; T (g)a^{3}čį$^{2-1}$ to ask for. (133, *k^{w}a) M-SM k^{w}ą̄ʔǫ̀; C kǭʔǫ̀; T gą^{3}ʔą$^{3-4}$h to go (these forms probably < PMx *am). (140, *xa) M-SM ^{n}dīhǫ̀; C ndāākūʔ; T da^{3}ką$^{3-4}$h /ką^{3}h sandal (this probably reflects PMx *x^{w}a/*xam—another instance of late PMx alternation consequent on reduction of sequence of labials.

3.2.2.4. Nasalized reflexes of PMx *ɔ include only: (1) Two M, T sets with nasalized reflexes in both languages (M ų, T ą) following *k. (2) Three M, C, T sets with nasalized reflexes in T (in all three sets), in C (in two of the three sets), and in M (in one of the three sets) following *n. The reflexes are: M ų (in CVʔV) and u (in CVCV); C u or o (non-nasalized) and ų or ǫ (nasalized); T ą. (3) One M, T set in which the T reflex is nasalized (M o, T ą) following *y. Of these sets there is perhaps a presumption in favor of believing that those following *k may possibly preserve reflexes of PMx *ɔm, in that the M, T cognates (no C in these sets) are consistently nasal. For two of the sets with *ɔ following *n there are A cognates with -am which afford direct evidence of PMx *ɔm. The set following *y is the most ambiguous in respect to PMx *ɔm vs. vowel nasalization in one of the particular languages;

in this set the nasalization of the T cognate is suspect. These six sets follow: (202, *kɔ) M-SM, J súkṵ̀; T ža^{5}kạ$^{5-3}$ tall. (203, *kɔ) M-SM, SE sūkṳ̀ neck; T gạ^{3}-(ži^{3}a^{2}) windpipe, zi^{3}-gạ$^{4-5}$ throat (with *k possibly weakened to g in the former phrase and subsequent generalization of this weakened form; cf. under *k in 3.1.1.2.). (221, *y-/*n-/*tnɔ) M-SM, J nṳ̀?ṳ̄, M-SE Nṳ̀?ṳ̄; C dḭ́ḭ́?yṵ́; T yạ$^{3-4}$? teeth. (222, *n) M-SM, SE, J kūnū; C káánù, héénò to run; T (g)u^{3}nạ^{2}h to run, (g)a^{3}nạ^{2}h to weave; A nam to run, hnam looms. (223, *n) M-SM, SE ?īnū, M-J šanu; C yṵ́ṵ́nṵ́; T n·ạhạ^{3} A hnam (pl) cigarettes (older meaning was probably tobacco; cf. T ko^{3}h nṳ^{3} tobacco —which may be a borrowing from M). (233, *y) M-SM, SE, J kōyō; T (g)a^{3}yạ$^{3-4}$h to pour out, to empty.

3.2.2.5. There is no clear evidence that both *u and *o occurred before *-m; very probably only one of these vowels occurred in that situation. In a few of the sets here pertinent—sets characterized by both nasalized and non-nasalized reflexes randomly distributed through the three languages—there is an M, C or T non-nasalized reflex that indicates *o rather than *u (cf. 3.2.1.6. and 3.2.1.7.). I assume, therefore, that PMx *o alternated with *om in these particular sets, and posit *om rather than *um. However, having posited PMx *om to the exclusion of *um, we are confronted again with the problem of distinguishing PMx *om from later nasalizations in the particular languages. The nasalized reflexes are summarized together in the following statements; in statement (2) in particular it is phonetically feasible to trace certain developments as stemming from PMx *om in that while some of the reflexes show influence of a bilabial (viz. *-m) there are others that do not: (1) M has ṳ after *t, *k, and *?. (2) M has also the following reflexes —presumably < PMx *om: u after *n and *ñ, M-SE ṳ after N. The following contrasting non-nasalized M reflexes are presumably from PMx *o (although both *o and *u may be merged in the M reflexes in these particular environments—in which case we would assume that both these vowels alternated with PMx *om): M-SM, J i after ñ and after t < *tn; M-SE i after N (< *tn) and ï after ñ. (3) T has nasalized reflex ụ. (4) C has ṳ in CVV and CV?V forms and possibly ọ in CVVCV forms (there is but one set, however, to witness to the latter.)

Illustrative data follow: (235, *to/*tom) M-SM tṵ́ṵ́, M-SE Nṵ́ṵ́ black; C túú soot; T (re^{3}ko$^{4-5}$) čṳ$^{5-3}$ black (zapote), čo^{3-5-4} soot. (244, *ko) M-SM, SE šīkù niece; C dáákù nephew; T zdu^{3}kṳ$^{4-5}$? nephew (similarly, M 'nephew' ~ C, T 'niece'). (243, *ko) C dàkṵ́ṳ̄ to dry; T na^{5}ko$^{5-3}$ dry. (245, *ko) M-SM čúkṵ́ louse, čūkṳ̄ fly; T žu^{3}ku^{3} insect, animal (for T, I assume that PT *-ko > ku

after development of ǯu^{3}- in first syllable; the sequence u...o does not occur in T). (263, *ʔom) M-SM, SE, J, M ʔų̄ʔų̀; C hų̄ʔų̄; T ʔų^{5}ʔų^{5} five (cf. A aum five, kinʔaum fifteen). (256, *n̄om) M-SM (yūkù) n̄ūù palm-tree, M-SE n̄ūù palm; C hl̨̄lý̨; T dų^{3}/yų^{3} palm. (257, *n̄o/*n̄om) M-SM tín̄ū, M-SE Nīī, M-J tin̄i; C ʔdų́ų́ fingernail. (258, *n̄o/*n̄om) M-SM n̄ī̄n̄ì, M-SE n̄ī̄n̄ì; C yų̄ų̄ʔ; T tų^{3} blood (for the consonantal alternations see 4.1.1.1.). (254, *no) C kūùnò, hīǐnò to plant, kō-nų̄ų̄ to dress oneself; T (g)u^{3}nų$^{3-4}$ to plant, na^{3}-nų$^{3-4}$ to dress oneself. (267, *t-/*tn- and *-o/*-om) M-SM kūtù, M-SE šīNǐ, M-J šiti; C dūūtū nose; T (g)u^{3}čų$^{3-4}$h to sniff, to smell.

NOTES

1. Certain M dialects not cited in this study have uniform d reflex (voiced alveolar or dental spirant) of PMx *θ—thus paralleling C. Representative of such dialects is the M of Tonahuixtla, Puebla (data from Ann Dyke). I posit PM *d reflex with subsequent palatalization to s/š in such M dialects as those included in this study.

2. The M dialect of Tonahuixtla, Puebla is typical of a group of dialects in which reflex tn occurs.

4. Phonological developments in penultimate syllables

4.1. Patterns of consonantal alternation in penultimate syllables.

4.1.0. The phonological developments in PMx penultimate syllables are much harder to trace than those in the ultimate syllables. This difficulty springs from the fact that, while there is a modicum of consonantal alternation in the ultimate syllables, such alternation is typical of the penultimate. Procedurally then, one finds that the consonants of the penultimate reconstruct with less consistency than the vowels. Proceeding, however, on the assumption that the consonants of the penultimate reconstruct on lines parallel with those laid down for the consonants of the ultima, one is able to reconstruct the patterns of consonantal alternation. These reconstructed patterns are of two differing types which I term paradigm A and paradigm B, corresponding to PMx noun and PMx verb respectively.

4.1.1. Paradigm A—which most often involves cognates that are nouns in the present day languages—essentially consists of *t- or *θ- alternating with *y- plus a few additional elements. The *t- or *θ- element is the same as the *θ- definite morpheme posited in 3.1.4.4.; the *y- was possibly a morpheme marking indefinite. Beyond this, it seems pointless to conjecture as to the semantic import of the other elements involved in the sub-varieties of paradigm A as described below:

4.1.1.1. 't' declension consists of *y-, *t-, and *^{n}d-. In pre-PMx times this declension probably represented *y-, and *(m)t-; *mt had become *^{n}d by PMx times. One atypical set of this sort seems to exhibit *y-, *t-, and *x- alternation. Set 62 is typical of this declension; although this set involves cognates that are M, C, T verbs rather than nouns, the verbs are presumably derivatives of a PMx noun: M-SM yù?ú to be afraid (*y-); C kā-ndìì?và to frighten (*^{n}d-); T žu^{3}?wi$^{3-5}$? to be afraid (*t-). More frequent than the full *y-, *t-, *^{n}d- alternation is *y-, *t- alternation in such sets as 70: M-SM (tì-)yà?ú (*y-); T ža^{3}?we$^{1-2}$ (*t-) lice-eggs. For further examples of this declension see 77, 107, 110, 135, 200, 209, 229, 234, 240, 245 (*y-, *t-); sets 44, 86, 266, (*t-, *^{n}d-); and set 71

(*y-, *t-, *x-).

4.1.1.2. 'θ' declension consists of *y-, *θ-, *ñ-, and *^{n}d-. In pre-PMx times this declension probably consisted of *(m)y-, and *(m)θ-; *my and *mθ had become *ñ and *^{n}d respectively by PMx times. In two atypical sets of this type *l- also occurs; in two other such sets *x- occurs. Set 264 is illustrative of this declension: M-SM yūčī something powdered (*y-). ñìtí sand (*ñ-); C (yą̄ʔą́) ndūùtèʔ sand (*^{n}d-); T da^{3}ču$^{4-5}$ (čų^{3}) sawdust (*θ-). Somewhat more frequent than the above are sets involving simply *y-, *θ-: (set 76) M-SM yīkį̄ (*y-); C yúúkū (*y-); T da^{3}ką$^{2-1}$ (*θ-) squash. For further examples of this declension see sets 66, 67, 68, 69, 74, 76, 132 (*y-, *θ-); sets 226, 238 (*y-, *θ-, *^{n}d-); sets 3, 14, 140, 147 (*θ-, *^{n}d-); set 20 (*y-, *ñ-, *θ-); set 24 (*y-, *θ-, *ñ-, *^{n}d-); set 127 (*y-, *θ-, *^{n}d-, *l-); set 142 (*y-, *θ-, *l-); and set 27, 270 (*y-, *θ-, *x-).

4.1.1.3. 'n' declension consists of *y-, *n-, *t-, and *tn-. Two sets of this sort have *^{n}d, *n alternation. This declension type is not as statistically frequent as the former two declension types. Set 277 illustrates *y-, *t-, *tn- alternation: M-SM tíñí, M-SE Níñí (*tn-); C ʔyūùdè (*y-); T žu^{3}tu$^{4-3}$ (*t-) mouse. Set 161 illustrates *y-, *n-, *tn-: M-SM tą́ʔą̄, M-SE Ną́ʔą̄ comrade, of the same class (*tn-); C nąʔą̀ a pair (*n-); T yą^{3}ʔą$^{5-3}$ twins (*y-). For further examples of this declension, see set 40 (*t-, *n-); set 58 (*y-, *t-, *n-); and sets 227, 230 (*^{n}d-, *n-).

4.1.1.4. Sets in which no reflex of *t-, *θ-, or *n- occurs are ambiguous as to declension type; cf. set 39 (*y-, *^{n}d-); sets 30, 72, 253 (*y-, *x-); sets 121, 236 (*y-, *^{n}d-, *x-); and set 199 (*^{n}d-, *l-).

4.1.1.5. There are three sets that seem to involve both *t- and *θ- in the same paradigm. It is necessary to examine these sets in order to see whether this overlap between the declensions is real or only apparent. These sets are sets 101, 77, and 202. We first examine set 101: M-SM tīʔvī to suck, suck blood, practice witchcraft (*t-); C tīīʔvī to suck (*t-); T zdu^{3}ʔwaha$^{4-3}$ witchcraft (*θ-, PT *žd). In that this set contains the T zd reflex of PT *žd, it need not detain us long; the overlap is here not clearly one between *t- and *θ-, but between *t and a PT element žd the origin of which remains obscure (4.2.7.2.). The crucial forms from set 77 are as follows: M-SM yūkū mountain (*y-); C ʔdáákó pile (*θ-), tííkó a little hill, ʔtííkù top, summit (*t-); T da^{3}ką^{3} slope, da^{3}kį̈$^{2-1}$ a hill of corn, the nose (*θ-). (For the differing vowel reflexes in the T ultimate syllable, see 3.2.2.2.). In evaluating this set for

its evidential value regarding *t-, *θ- overlap, it is well to note the penultimate vowels. Significantly enough, the C and T forms reconstructing with *θ- reconstruct also with penultimate vowel *a; while the M forms reconstructing with *y-, and the C forms reconstructing with *t- reconstruct with penultimate vowel *u-. Apparently then, we have in this set forms deriving from two different PMx nouns, one noun with penultimate vowel *u that belonged to the 't' declension, and another noun with penultimate vowel *a that belonged to the 'θ' declension. The overlap between declensions is only apparent in this set. The third case of apparent overlap is in set 202; M-SM sú́kʉ́ (*θ-); T ža^{5}ką$^{5-3}$ (*t-) tall. This is possibly the best set from which one could argue for overlap between the declensions, but the forms of the set are few and we may here have mixture of forms from two different PMx nouns. However, it is perhaps significant that the M and T forms can be reconstructed with penultimate vowel *ɔ while in set 77 two different penultimate vowels must be reconstructed. In summary then: of the three cases of apparent overlap between 't' and 'θ' declensions only one set gives us anything at all solid, but the hypothesis of mixture of forms from two declensions cannot be ignored even in that one case. It remains that the 't' and 'θ' declensions are clearly defined patterns within paradigm A.

4.1.1.6. It is interesting to note that M typically preserves *y- forms of the above paradigms, while T preserves *t- and *θ forms with much greater frequency, and exhibits a *y/*d alternation in its present day grammar (cf. 159, 172, 190, and 231). Nevertheless, the reality of the assumed PMx consonantal alternations described above is established by the following facts: (1) M in a few sets (3, 147, 238) does preserve *θ- forms where C and T do not. (2) C agrees with T witness to *t- or *θ- in a few sets (24, 27, 77, 107, 226) as opposed to M witness to *y-. (3) An altered form of this consonantal alternation exists both in A as well as in T (see discussion under 3.1.4.4.).

4.1.2. Paradigm B—which most often involves cognates that are verbs in the present day languages—involves the following consonantal alternations: *k^{w}-, *x-/*xi-/*w-/*y-, *k-, *^{n}d-/*n-. These four elements were tense-aspect morphemes with some such meanings as: (1) potential or future, (2) continuative or present, (3) completed or past, (4) state of completion or prior past. These four tense-aspects survive as such in C where they are indicated by the abbreviations po, pr, pt, and pp respectively (CMM, p. 50). Nevertheless, all three languages have modified the original tense-aspect system in various ways. These grammatical developments

are described below before considering the consonantal alternations involved in this reconstructed paradigm:

4.1.2.1. M, C, T grammatical developments obscuring PMx paradigm B.

4.1.2.1.1. M has completely lost the distinction between *k^{w}- and *k- aspects. By a sort of syncretism, some M verbs have come to have k^{w}- in their basic form (the M potential), while others have k-. In a few sets (notably 84), related verbs from the same PMx root exhibit k^{w}- vs. k-. Filling somewhat the function of the old *k- completitive or past tense-aspect is the M construction nì (completitive) plus verb (with form of the M continuative except for tone). The old *x-/*xi-/*w-/*y- aspect survives as a living part of M structure, but the third allomorph is eliminated; there has been some extension of the palatalizing effect of the second and fourth allomorphs (cf. set 248 which has kūsù in the basic form but kūšǐ in the continuative); and there has been a regular tendency to raise the tones of the continuative (this may have beginnings in PMx itself, cf. set 222). The *^{n}d-/*n- aspect survives in some verbs as a sort of stative formation (cf. 48 kūū to be, to be able, ^{n}dūū to become); in other verbs it has become the basic form in one or more of the M dialects (sets 8, 52).

4.1.2.1.2. C has somewhat—but by no means entirely—syncretized the *k^{w}- and *k- aspects, so that a potential of a given C verb may hark back to either one or the other form. Nevertheless, the latter tense-aspect (the completive or past) has been preserved as a living category in the course of the following developments: (1) Many verbs originally taking PMx *x- or *w- continuative were analogically shifted to *xi- continuative. (2) The *i vowel of the *xi- continuative was then extended to the *k- aspect of most verbs. This was presumably a very early development in PC. (3) Following this, the PC *ki went by regular sound change to či— which is typically the formal indication of the C past. (4) Allomorph *y- of the PMx continuative has survived as C i- present with analogical extension to many C verbs. (5) In more recent times two further sorts of analogical developments sporadically modified the form of the C past in verbs that had not shared in steps (1) and (2): (a) some verbs with ka- past received vowel i of the present, thus passing through step (2) after the sound change of step (3) had ceased to operate; these verbs remain ki- or ke- in the past (123, 145); (b) others analogically became ča- (143). (6) There still remain, however, a few verbs with ka- form in the past (160). (7) Because of the syncretism of *k^{w}- and *k- forms referred to at the head of this paragraph, there are C verbs that have the same form in the

potential and past (63, 116). Other verbs distinguish the potential from the past by virtue of a tone change in the latter (101, 103). Tone pattern mid-low on the penultimate and low on the ultima has become a favorite C tone pattern for the past (6.1.3.7.). (8) Somewhat akin to the development sketched above is the C extension of vowel i of the present and past to the stative or prior past which consequently becomes quite regularly ndi- or ni-. This preference for vowel i in the last three tenses results in a certain amount of similarity between these forms as opposed to the form of the potential.

4.1.2.1.3. Sound change in T wrought considerable havoc with the old PMx tense-aspect system. PMx consonant-vowel penultimate combinations *ka, *xa, *kɔ, *k^{w}ɔ, and *xɔ all became T ga- by regular development. There was, therefore, obliteration of the distinction between PMx completitive and continuative for verbs having the *x- allomorph before penultimate vowels *a and *ɔ. Furthermore, since the *x- allomorph seemed to have been preferred to *xi- in PT (a tendency contrary to that in PM and PC where the sphere of distribution of the 'palatalizing' allomorphs was extended), this was a serious impairment of the distinction between these two PMx aspects. Furthermore, before *i (where sound change did not obliterate the distinction between PMx *ki and *xi), the sound change gave, on the contrary, reflexes so divergent (*ki > T gi-, but *xi > ži-) that the paradigmatic connection was possibly impaired. Somewhat less serious, but nevertheless disturbing, was the merger of *k^{w}ɔ and *kɔ into T ga-. Since *k^{w}- occurred only before PMx *i, *a, and *ɔ in penultimate syllables, and since the latter vowel was statistically rather frequent in PMx, the merger of *k^{w}ɔ and *kɔ meant an impairment of the distinction between the PMx *k^{w}- potential and *k- past. Sound change here aided the general M, C, T tendency towards syncretism of the *k^{w}- and *k- forms. Only in one respect does T preserve more clearly than M or C a feature of the old aspect system, and this is in the survival of the old *w- allomorph of the continuative or present in a restricted class of T verbs (see below).

On the ruins of the old PMx aspect system, T built a new system along the following lines: (1) A g(V)- morpheme (comprised historically of the remnants of the aspect-marking morphemes of the first three PMx aspects) became the marker of a <u>non-continuative</u> aspect. (2) This g(V)- element was dropped from the verb to form a new <u>continuative</u> aspect (e.g. ga^{3}ča$^{2-1}$ <u>sang</u> vs. a^{3}ča$^{2-1}$ <u>singing</u>; gi^{3}nạ$^{2-1}$ <u>washed</u> vs. nạ$^{2-1}$ <u>washing</u>). An initial model for

this development may have been provided by the T elimination by regular sound-change of initial *y- from continuatives of the 'y' conjugation (cf. set 248). (3) In a development, the details of which are as yet obscure, the tones of the forms with the g(V)- element were lowered to form a new potential (e.g. ga^{4}ča^{4} will sing and gi^{5}nǫ^{5}h will wash). (4) Some verbs have retained forms with dV- or nV- elements (coming by regular sound change from the PMx *^{n}d-/*n- aspect). But there has ceased to be any paradigmatic connection in that these elements now pattern as derivative rather than inflectional. It is, indeed, a synchronic problem in T itself as to whether or not these elements should even be accorded morphemic status in many verbs.

4.1.2.1.4. In all three languages some old forms basically of paradigm A, i.e., PMx nouns, are given aspectual proclitics or prefixes and treated as verbs. This gives an overlap of paradigm A with paradigm B in some sets. Furthermore, one PMx aspect is sometimes 'frozen' as the stem form of the verb and appropriate particles (abbreviated auxiliary verbs) introduced to round out the aspects; this is especially typical of C (sets 48, 113, 116, 123, 227).

4.1.2.2. Paradigm B as reconstructed—once one has cleared away the M, C, T developments described above—has four subvarieties according to the allomorphs of the continuative or present aspect. These conjugations are illustrated below.

4.1.2.2.1. The 'x' conjugation is well illustrated by set 84: M-SM kāšį̀ (po < PMx *k-), hāšį́ (cont < PMx *x-) to press, to chew; k^{w}àšį̄ (po < PMx *k^{w}-), hášį̄ (cont < PMx *x-) to press, to nail; C ʔkāādì (po < PMx *k-), ʔīìdì (pr < PMx *x- replaced by *xi- with obliteration of the h reflex by metathesized ʔ), čīìdì (pt < PMx *k- plus vowel i from the pr, and with passage of *ki > či.) nʔdíídì (pp < PMx *nd- plus vowel i from the pr) to shake something; T (g)a^{3}cï^{3}h to touch, feel (with merger of PMx *k(a)- and *x(a) to T ga-; with development of new cont a^{3}cï^{3}h by loss of g-; and with development of po ga^{4}cï^{3}h will touch.) Set 181 is one of the rarer sort of sets in which C does not extend vowel i through the last three tenses of the paradigm: M-SM k^{w}àʔā (po < PMx *k^{w}-), háʔā (cont < PMx *x-) to give; C kāʔà (po and pt < merger of PMx *k^{w}- and *k- in this environment), hāʔà (pr < PMx *x-); nāʔà (< PMx *n-) to give, to sting; T (g)a^{3}ʔwi$^{3-5}$ʔ to give, to strike (with merger of PMx *k(a)- and *x(a)- to T ga^{3}; with development of new cont by loss of g-; and with development of new po ga^{5}ʔwi^{5}ʔ will give). For further examples of this conjugation, see sets 7, 21, 36, 116, 274, 275.

4.1.2.2.2. The 'xi' conjugation (not presence of penultimate syllable *xi- per se, but a *xi- pr alongside of other vowel quality in the reconstructed penultimate syllables of the other aspect forms) is illustrated by set 222: M-SM kūnū (po), kǘnū (cont) (both < PMx *k^{w}(a) with analogical creation of new cont by raising of tone after this verb split off from the following one) to weave; kūnū (po, same form as above), hǐnū (cont < PMx *xi-) to run; C kǎánù (po < PMx *k-), héénò (pr < PMx *xi—for the e reflex rather than the expected i, cf. 3.2.1.1.), čéénò (pt < PMx *k- plus vowel i of the present, and subsequent passage of *ki-> če-), néénò (pp < PMx *^{n}d- plus vowel i from the present) to run; T (g)u^{3}nạ^{2}h to run (< PMx *k^{w}(a)—with development of u^{3}nạ^{2}h cont and gu^{4}nạ^{4}h po), (g)a^{3}nạ^{2}h to weave (PMx *k(a)- with development of a^{3}nạ^{2}h cont and of ga^{4}nạ^{4}h po), ži^{3}nạ$^{1-2}$ loom (probably PMx *xi-; this aspect has survived here 'frozen' as a T noun). For further examples of this conjugation, cf. 56, 59, 60, 105, 123, 126.

4.1.2.2.3. The 'w' conjugation is illustrated by set 26: M-SM kīnī disgusting, repulsive (M adj. from PMx verb in *k- aspect); C tū-vīīnú (po), ɪ-tū-vīīnú (pr), tū-vīĭnú (pt), nɪ-tū-vīīnú (pp) to disgust (all these forms are built on PMx *w- aspect 'frozen' as the C stem-form); T ni^{3}ñihï$^{4-3}$ disgusting (< PMx *n- aspect).

Set 133—involving PMx ultimate syllable of *CV?V structure—illustrates sets of the sort in which *w- survives as a grammatical feature in T: M-SM k^{w}ą̄?ą̀ (po < PMx *k^{w}-), hą́?ą̀ (cont, an analogical creation replacing PMx *w- aspect) to go; C ką̄?ą̀ (po < PMx *k-), hę̄?ę̄ (pr, an analogical creation replacing PMx *w- aspect), čę̄?ę̄ (pt < PMx *k- plus vowel of C pr and passage of ki/ę > čę), nę́?ę̄ (pp < PMx *n- plus vowel of C pr) to go, k^{w}ę̄?ę̀ you went (< PMx *k^{w}-); T wą^{3}?ą$^{3-4}$h going (cont < PMx *w- aspect), gą^{3}?ą$^{3-4}$h went (< PMx *k-), ną^{3}?ą$^{3-4}$h to go back, return (possibly < PMx *n-). In positing the priority of the *w- form witnessed to by T as over against a possible *x- form witnessed to by both M and C, I simply argue that analogical pressures are everywhere at work in M and C verb paradigms in the direction of eliminating old *w- forms, while there are no evident analogical pressures to account for the T w reflex. The T w- form bears the appearance of an archaic feature in that it characterizes a restricted class of verbs and is no longer a productive pattern. For further examples of this conjugation—involving consonantal alternation in either the penultimate or the ultima, see sets 4, 131, 134, 145, 206.

4.1.2.2.4. The 'y' conjugation is illustrated by set 9: M-SM, SE kàhī fever (noun < PMx *k- aspect); C dà-kààčī (po), ī-dà-kààčī (pr), dā-kààčī (pt), nī-dī-kāāčī (pp) to boil (these forms are built

on PMx *k- aspect 'frozen' as the C stem-form); ʔyūūčī (po), ɪ-ʔyūūčī (pr), ʔyūùčî (pt), nî- ʔyúúčí (pp) to fry (these forms are built on PMx *y- continuative 'frozen' as the C stem-form); T (nɥ$^{3-4}$) ga^{3}čiʔi$^{4-3}$ to have a fever (noun or adjective < PMx *kɔ- and/or *k^{w}ɔ- aspects). Set 11 preserves a M witness to the PMx *y- continuative: M-SM čī-^{n}dùhī (< PMx *^{n}d- aspect), yùhī (< PMx *y- continuative) to bury; C ʔkūūčī (po < PMx *k^{w}-aspect), ʔīīčī (pr < *y- continuative), č ʔīîčî (pt < *k- aspect with C vowel palatalization and passage of *ki> či), nʔdííčí (pp < PMx *^{n}d- aspect) to plant, to sow; T (g)a^{3}čɥ$^{3-5}$ʔ to bury (with merger of PMx *k^{w}(ɔ)- and *k(ɔ)- aspects to T ga^{3}-; with loss of *y- from PMx continuative creating by regular sound change one of the vowel-initial forms which served as model for development of T continuative by dropping of g-/gV- from other verbs; and with development of new potential form ga^{5}čɥ^{5}ʔ by lowering of stem tones. For other examples of 'y' conjugation, see 28, 205, 248.

4.2. Reflexes of PMx consonants in penultimate syllables.

4.2.1. Stops.

4.2.1.1. PMx penultimate *t has uniform reflex t in M, C, and ž in T. In comparison with reflexes of *t in ultimate syllables, it may be noted that: (a) in M, there is no palatalized č reflex before front vowels in penultimate syllables, although such a reflex does occur in ultimate syllables. (b) T ž reflex is probably the nearest phonetic equivalent of T č which occurs only in ultimate syllables, where it is the regular reflex of PMx *t. (101, *tu-) M-SM tī̀ʔvī; C tīīʔvī to suck. (103, *tu-) M-SM tī̀vì; C tīīvī to play a wind instrument, to blow. (102, *ti-) M-SM (s)tívî, M-J sa-tivi to err, to destroy; C dā-tùùvī to destroy. (107, *ta-) C táátá tile; T ži^{3}ča$^{2-1}$ back of, roof, (110, *tɔ-) M-M tutu firewood; T ži^{3}čɥ$^{2-1}$ (poss) wood, stick, firewood.

4.2.1.2. PMx penultimate *k has uniform reflex k in M; reflex č in C before PMx *i, but reflex k elsewhere; and uniform reflex g in T. In comparison with reflexes of *k in ultimate syllables, it may be noted that: (a) In M, there are no palatalized h (M-SM, SE), č (M-J) reflexes before *i in penultimate syllables (set 26), although such reflexes do occur in ultimate syllables. (b) T g is the lenis stop corresponding to the fortis k which occurs only in ultimate syllables where it is the most frequent reflex of PMx *k. (84, *ka-) M-SM kāšɥ to press, to chew; C ʔkāādî to shake something; T ga^{3}cï^{3}h to touch, feel. (105, *ka-) M-SM kātā; C kāātā; T ga^{3}ča$^{2-1}$ to sing. (123, *ka-) M-SM kākā; C káákâ; T ga^{3}če$^{2-1}$ to walk. (9, *kɔ-) M-SM kī̀hī fever; C dà-kààčī to boil; T ga^{3}čiʔi$^{4-3}$ fever. (197, *ku-) M-SM kī̀tì to boil; C (kūūvē) kūūtùʔ to get warm;

T gu^{3}yą$^{3-4}$h to boil (with *t, *y alternation in last syllable).

4.2.1.3. PMx penultimate *k^{w} has M reflex ku (with loss of following vowel) except when the following syllable began with *?C cluster—in which case the reflex is *k^{w} with retention of following vowel. C has reflex *k^{w} before PMx *i, and reflex ku (with loss of following vowel) in other situations except that: (a) reflex k occurs before *a(?w), and (b) reflex k^{w} occurs before *ɔ(?ng). T has reflex gu before PMx *i and *a (with loss of following vowel), but reflex g before PMx *ɔ (with loss of labial component). (28, *k^{w}i-) M-SM kūnì to see, kūnī (sð?ō) to hear; C k^{w}ĭĭnó to look at; T gu^{3}nï^{3} to hear. (48, *k^{w}ɔ-) M kūū to exist, to be able; C kūūvē to complete; T ga^{3}wi^{3} to be, to become. (60, *k^{w}ɔ-) M-SM kùčī; C kúúná (dīī); T ga^{2}ne^{3} to ripen. (181, *k^{w}a?w-) M-SM k^{w}à?ā to give; C kā?à to give, to sting (cf. T form < *ka-: ga^{3}?wi$^{3-5}$? to give, to strike), (217, *k^{w}ɔ?ng-) M-J k^{w}iku to sew (other M dialects have *kɔ); C (kā?mą) k^{w}āākū to swear, to testify (cf. T form < *θɔ-: da^{3}?nga?a$^{4-3}$ scar, proof). (254, *k^{w}a-) C kūùnð; T gu^{3}nų$^{3-4}$ to plant, to sow.

4.2.2. Spirants.

4.2.2.1. PMx penultimate *θ has uniform reflex d in C, but divergent reflexes in M, T according to front vs. back articulatory position of the following proto vowel. These conditions were stated under 3.1.2.1. in reference to ultimate syllables and apply with a modicum of adaptation here: In M, reflex š occurs before *i and *ī, but s elsewhere; in T z occurs before *i and *ï (rather than the affricate c which is restricted to ultimate syllables, where it is the regular reflex of *θ before front vowels), and d elsewhere (rather than the fortis t which is restricted to ultimate syllables, where it is the regular reflex of *θ before proto back or central vowel). (48, *θa-) M-SM sāù, M-J savi rain; C dāāvē thunder; T du^{3}?wi^{3} thunder, rain-deity. (24, *θa-) C ?dĭĭnó brother; T di^{3}nï$^{2-1}$ brother of a man (cf. M-SM < *ĭĭa-: ĭĭānì brother of a man). (106, *θa-) M-SM stāà, M-J šita (with *a > i(t), and subsequent palatalization of s > š); T da^{3}ča$^{2-1}$ (poss) tortilla. (23, *θi-) M-SM šų?ų́ money, a bit, šų́?ų́ bright, shining; T zą^{3}?ąhą$^{4-3}$ money; mi$^{1-2}$ copper-colored, yellow, zi^{3}-mi$^{2-1}$ yolk (of an egg) (Notice that the M and T forms have retained typical pre-front-vowel reflexes of *θ even though subsequent developments in both languages have resulted in central or back vowel following the reflex of *θ). (238, *θi- in M, but *ndi- in C, and *yi- in T) M-SM šīkō; C ndīīkū; T-Co iko twenty. (237, *θi- only in T, *k^{w}i- in C) C k^{w}īīkō hunger; T zi^{3}-ko$^{3-4}$h stomach.

4.2.2.2. PMx *x gives reflex h in M, C (h, h, č in M-SM, SE and J respectively)—apparently without the C palatalization

(*xi > či) that is characteristic of this phoneme in ultimate syllables. When there occurs in C a metathesis of the *? of PMx *?C medial cluster, this metathesized ? replaces the h reflex. T has reflex ž before *i, and g elsewhere; these reflexes are the phonological equivalents of reflexes č and k which are phonemes restricted to ultimate syllables. (176, *xi-) M-SE hī?ñā; T (gi^{3}) ži^{3}?yą$^{3-4}$h to bark (of a dog). (222, *xi-) M-SM hínū (cont) to run; C héénɔ̀ (pr) to run; T ži^{3}ną$^{1-2}$ loom (for the semantic tie-in, see 222). (27, *xa-) M-SM tī-hání; C (dāīyā) híínɔ́ grandson. (13, *xɔ-) C húúčè; T du^{3}gwa^{3}či$^{3-4}$? niece (with PT *ga- > gwa- after preceding u). (84, *xa-) M-SM hāšʦ (cont) to press, to chew; C ?īìdî (pr) to shake something (with *xa- replaced in PC by *xi- and obliteration of h reflex by metathesized *?); T ga^{3}cī^{3}h to touch, to feel (presumably reflecting merger of PMx *ka- and *xa-).

4.2.3. The pre-nasalized stops.

4.2.3.1. PMx *^{n}d gives more uniform reflexes in penultimate than in ultimate syllables. M has uniform reflex ^{n}d except for one set that seems to indicate reflex n before following syllable beginning with n. The C data are extensive enough to establish the above as valid for penultimate syllables in that language; viz., C has reflex n before following syllable beginning with n, and has reflex nd elsewhere. PMx *^{n}d does not survive as a cluster in T penultimate syllables, but splits into two reflexes: n before T č and velars, d elsewhere. (144, *^{n}dɔ-) M-SM ^{n}dūčā; C nų̄ų̀nę̀; T da^{3}ne$^{3-4}$ (poss) water. (10, *^{n}da- in M, T; *^{n}dɔ- in C, T): M-SM ^{n}dáhí to untie; C ndūūčī to awaken; T na^{3}čį^{3} to untie (presumably < *^{n}da-), na^{3}či^{3} to awaken (presumably < *^{n}dɔ-). (17, *^{n}du-) M-SM ^{n}dūčī; C nų̄ų̀nę̄ beans. (44, *^{n}da-) M-SM ^{n}dá?ú poor; T da^{3}?wi^{3} to owe. (54, *^{n}da-) C ndāāvā; T na^{3}gwi$^{3-4}$ to choose). (82, *^{n}di-) M-SM ^{n}dīšī; T di^{3}ci$^{3-4}$ (poss) roasting-ear. (37, *^{n}du-) M-SM nūnì; C nʦ́nǫ́; T di^{3}?nï$^{2-1}$ (poss) corn.

4.2.3.2. It is very doubtful whether PMx *^{n}g and *^{n}g^{w} occurred in penultimate syllables. There is in our cognate sets one apparent reflex of the former in T. However, in this set (224) it is doubtful whether a PMx penultimate syllable should be reconstructed at all; the M ti- may represent a recent fusion of tī animal (<*tu?), the C ?iį- may hark back to some PC yu(m)- element, and the T ngu- is the doubtful element here under examination. However, it is possible that these preposed elements hark back to PMx *tu-, *yum- and *^{n}gu- respectively: M-SM tī-ñùú hens, tī-ñùú (šíní) stars; C ?ʦ́yǫ́ stars; T ngu^{3}ya$^{4-3}$ road-runner.

4.2.4. The lateral, nasals, and semi-vowels.

4.2.4.1. Slightly more substantial, but nevertheless scanty, is the

evidence for PMx *l in penultimate syllables. The reflex is uniformly *l in the two languages (M, T) in which it is attested. (127, *la-) M-SM lāk^{w}ā pus; T la^{3}kwe^{3}h mucus. (199, *li- in M-SM; *^{n}di- also in M-SM, in other M dialects, and in T) M-SM lī̀kì, ^{n}dī̀kì; T ni^{5}ka^{5}? short. (142, *la- only in T; *ya- in M; *θa- also in T) M-SM yák^{w}á crooked; T du^{3}gwa$^{3-4}$? to turn, or to twist downward, du^{3}gwą^{3}?ąhą$^{4-3}$ a forked stick, la^{3}kwą^{3} lame. But the T form with la- in the latter set may be a back formation from the preceding form (cf. 142).

4.2.4.2. PMx *n has uniform M, C, T reflex n in penultimate as well as in ultimate syllables. (91, *nam- in C, *na- and *ni- in T) C nā-?nąą́nį́ to open; T na^{3}?nï^{2}h to open, na^{2}?nïhï$^{5-4}$, ni^{2}?nï-hï$^{5-4}$ open (the latter may be some sort of T development, rather than PMx *ni-). (204, M *na-, T *ni-) M-SM nāsù it isn't so, none of; T ni^{3}ta^{4}h nothing of, none of. Of interest here is the particle or proclitic *na resumptive-repetitive that occurs as na in all languages. I give here examples of its use even though these examples involve prior syllables: M-SM sá?ā+ná I'm doing it vs. nā-sá?ā + ná I'm going to do it again; C n?dą́ātī + dē he loosened it vs. nā-n?dą́ātī + dē he loosened it again; T gi^{3}?ya^{3}h zi^{3} he did it vs. na^{3} gi^{3}?ya^{3}h zi^{3} he repaired it.

4.2.4.3. PMx *ñ very probably occurred in penultimate as well as in ultimate syllables. There are ten occurrences of ñ in the penultimate syllables of the M cognates in our sets. There can, however, be no C or T confirmation of PMx *ñ in penultimate syllables, since (a) PMx *ñ and *y unconditionally merged into C, T y everywhere, in ultimate as well as in penultimate syllables. Consequently C or T reflex *y is often ambiguous as to origin. (b) The situation in regard to the consonantal alternation in the penultimate syllables is fluid enough that it would be possible to contend that ñ in M penultimates is exclusively a development in that language. Nevertheless, the frequent occurrence of PMx *ñ in ultimate syllables (where consonantal alternation is comparatively infrequent) along with the occurrence of M ñ in the ten sets just mentioned, makes it rather probable that PMx *ñ occurred in both positions. Therefore, in 4.1.1.1., I not only posited penultimate *ñ but accorded it a place in the patterns of consonantal alternation that comprise PMx paradigm A. The consistency and symmetry of the 'θ' declension of that paradigm—the declension in which PMx *ñ plays a part—may be regarded as indirect confirmation of the existence of that phoneme in PMx. (159, with *ñ in M, but with ambiguous y reflex in C, T) M-SM ñų̄?ų̄; C yą́?ą̀?; T yo^{3}?o$^{1-2}$ land, soil. (157, as above, except that M-J reflects *y rather than *ñ) M-SM

ñū?mà, M-J yu?ma smoke; C ?yą̄ą̄?mē̄ smoke; T yo^{3}?o$^{5-3}$ the gummy deposit made by smoke from a wood fire. (264, with *ñɔ and *yɔ in M-SM etymological doublet; with *^{n}dɔ- in C; and with *θɔ- in T) M-SM yūčī something powdered, ñìtí sand; C (yą̀?ą́) ndūùtè? sand; T da^{3}ču$^{4-5}$ (čų^{3}) saw-dust.

4.2.4.4. PMx *y-, which has a virtually uniform reflex y in M, C, T ultimate syllables, is subject to some conditioned sound change in penultimates. The basic M reflex is y, but *yi-, *ya-, and *yu- > M ?i- preceding certain alveolar consonants in the following syllable. The conditions seem to vary somewhat according to occurrence of *y directly before each of the three vowels mentioned above, but this variation may be more apparent than real since our data are limited. Specifically, however: *yi- > ?i- before n and N (the latter phoneme found only in M-SE); *ya- > ?i- before s, ñ, and ?y; *yu- > ?i- before n, s, y, and č. C has reflex y except that (a) *ya- > hii- before va and ?ma; and *yu- > hii- before (?)va, ko, and ku. (b) *yu(m)- > ?ii before y. (But the sets illustrating the latter are poor, and this ?ii- may be a PC development.) The C hii- reflex vs. the ?ii- reflex is somewhat obscured in some sets by metathesis of the *? of PMx medial -?C- clusters; when the *? is shifted to medial position it regularly replaces the original C h. T has reflex y except that in T-Ch (as opposed to T-Co) there is a very widespread tendency to drop y before a (< *a or *ɔ), and to eliminate entirely old *yu- penultimate syllables. T-Co, on the other hand, preserves most of these features, but shares a parallel development with T-Ch in that both dialects entirely eliminate *y before i. (68, *yu-) M-SM yūū; C hīīvā; T-Ch w·e$^{1-2}$, T-Co yuwi straw-mat. (69, *ya-) M-SM nùyá?ù market-place, yà?ū pay, wages; C ?ííví̀ market place (with metathesized *? from *-?w- replacing former h reflex); T-Ch ?we^{3-4-3}, T-Co yu?wi market place. (67, *ya-) M-SM yāù; C hīīvā hole; T-Ch w·ehe^{3} cliff, cave. (18, *yu-) M-SM ?ī̀čī road, direction towards; C yǫ́ǫ́né road; T-Ch ne$^{3-4}$? direction towards. (41, *yɔ-) C yúūvè toe-nail; T-Ch a^{3}wi^{3}, T-Co yawi head. (77, *yu-) M-SM yūkū mountain; C hīì̀kù hill; T-Ch kīhï^{3} mountain. (30, *yi- in M, but *xi- in C, with loss of penultimate in T) M-SM ?ī̀nī̀ insides, non-physical, metaphorical; C hīì̀nō insides, non-physical, metaphorical; T ?nī^{5}h inside of. Set 224 has a C form that possibly harks back to PMx penultimate *yum-, but as described above, this may be a PC development instead: M-SM tī-ñùú hens; C ?ǫ́yǫ́ stars; T ngu^{3}ya$^{4-3}$ road-runner.

4.2.4.5. PMx *w is of infrequent occurrence in penultimate syllables. As stated in section 4.1.2.1., *w- initial forms have been

analogically leveled in paradigm B in almost all the M and C of our sets. Furthermore, T itself—which preserves forms of the 'w' conjugation more frequently than do the other two languages—seems to have eliminated all *wi- syllables in a development parallel to that which eliminated *yi- syllables. As a result, *w appears in our cognate sets before *i and *a in the M and C of the sets, but only before the latter vowel in the T. PMx *w has reflex v before *i in both M and C, and uniform reflex w in T. In M *wa > ʔu before ni, and > ʔi before n̈u. In C *wa- > ʔii- before nu. These latter reflexes involving *wa- illustrate the general tendency to eliminate y and w/v from M, C, T penultimate syllables. As we have already had occasion to note, this tendency is especially marked in T-Ch, but is also at work in M and C. (219, *wi in M, with loss of penultimate syllable in one T cognate, and *ⁿdi- in another T cognate) M-SM vīkò cloud, T nga^{3} cloud, ni^{5}nga$^{5-3}$ damp, moist. (57, *wi- in M, with loss of penultimate syllable in T; trace of this loss is preserved in the strengthening of T n > nˑ) M-SM v̈ïčï; T nˑe$^{5-3}$ naked. (26, with *wi- only in C; with *ki- in M, and ni- in T) M-SM kīnī disgusting, repulsive; C tū-vīīnú to disgust; T ni^{3} nïhï$^{4-3}$ disgusting. (31, *wa-) M-SM ʔūnǐ; C ʔīïnù; T wa^{5}ʔnï^{5}h three. (173, *wa-) M-SM ʔïn̈ù; T wa^{5}tą^{5}ʔ six (with *θ/*n alternation in the ultimate syllable). The last set—on which the posited PMx *wa- > M ʔi(n̈u);hinges—is somewhat suspect in that there exists a T form ya^{3}tą^{4}ʔ six more which may be more original than the w- initial form. The latter might conceivably be an analogical reshaping to conform to wa^{5}ʔnï^{5}h three and wˑi^{5}h two. If this alternative hypothesis should prove correct, the ʔi- of the M is here simply the regular M reflex of *ya.

4.2.5. Fusions of M, C dentals with *y-.

4.2.5.0. The above paragraphs summarize developments of PMx consonants in penultimate syllables. There are a number of sets, however, in which M or C č or ty seems to reflect recent fusions of tV- with *y- in those languages. There are also a few sets in which C d followed by front vowel seems to reflect a similar fusion of some C dV- element with *y. There is a possibility that some of these reflexes hark back to PMx *ty- and *dy-, but there is little solid evidence to substantiate this.

4.2.5.1. M tVy- > č in M-SM, SE; > ty in M-J. Many of the forms exhibiting this fusion involve tī-/ti- animal, thing followed by *y- initial stem. In M-SM both fused and unfused forms are current. (200) M-SM tī-yǒkó, čǒkó; M-SE čǒkó, M-J tyoko ant. (229) M-SM tī-yǒʔó, čǒʔó; M-SE čǒʔó; M-J tyoʔo flea. Three other examples of this sort of fusion are phonologically similar

but seem to involve unidentified tV- elements: (69) M-SM yà?ū pay, wages, čà?ū to pay, M-J tya?vi to pay. (158) M-SM nǐ-čā?mà, M-SE nī-čímā flattened. (278) M-SM, SE tē?yù, M-J tya?yu to spoil, to rot. The latter set probably is a special situation in which ty > te in M-SM, SE (rather than > č) before ?y in the following syllable.

4.2.5.2. In the C of our sets there are two examples of č and two examples of ty. I assume fusion of some PC *tV- element to *y-initial stem with this fusion resulting in č before following ?v or n, and in ty before following k or d. Further data might make possible a more general and hence less trivial statement of the factors conditioning these two sorts of fusion. (69, cf. M in paragraph above) C ?íívà market place (*ya-), číí?và wages (PC *tVy-). (276, with *xa- in M) C čēēnō sister-in-law (PC *tVy-). (115) C tyáákā́ banana. (277) C ?yūùdè, ?tyūùdè mouse.

There are two sets in which the C presumably reflects fusion of some PC *dV- element with initial *y-. In each case the fusion results in dii-. (69) C nā-díí?vā (note that in the above paragraph, PC *tVy > čii- in this set). (194) díítū full.

4.2.5.3. Peculiar significance attaches to set 194 in which the M apparently involves fusion of a PM *dV- element (< *θV-) to following *y- initial stem. Unlike the fusion of M tVy- > č as described above, the PM dVy- fusion occurs everywhere in all dialects here cited and gives č in M-J as well as in M-SM, SE. This set gives the only instance in my M word-lists of penultimate č ~ č ~ č in these three dialects. Thus, while fusions of *tVy- proceed at different rates and manners in these three dialects, the fusion here described must have taken place in PM itself in that it occurred before the split of PM *d > s/š and d in the various dialects.[1] It should furthermore be noted that, as shown in the above paragraph, C also involves a dVy- fusion. It is therefore possible to argue that we have here a PMx *dy- cluster rather than parallel PM and PC developments. Nevertheless, since we have but one set with such a consistent M witness, and since other such fusions seem to be M and C developments, I assume here that the parallel PM and PC developments simply reflect fusions of the same preposed PMx *θV- element, but that this fusion took place after the PMx period. The M of this set follows: (194) M-SM čítú, M-SE čítú, M-J čitu full.

4.2.5.4. A further type of fusion involves PM or PC *^{n}dV- to *y-initial stems. In the three such sets in our array of cognates, all such *y- initial stems are those with penultimate *ya-. The fusions are as follows: PM *^{n}dVya- > M-SM ^{n}ja-, M-SE ^{n}de-, M-J ^{n}da-, M-M ^{n}dya-; PC *^{n}dVya- > nčaa-. Examples follow: (116) M-SM

ⁿǰākā, M-SE ⁿdēkā, M-J ⁿdaka take along. (117) M-SM ⁿǰākà, M-SE ⁿdēkà, M-J ⁿdaka, M-M ⁿdyaka glue. (121) C yáákā pine-wood, ī-nčáákā? ladder (with preposed C i- as well.

4.2.6. T r- in penultimate syllables.

4.2.6.0. There are twenty instances in our cognate sets of T r- in penultimate syllables. There are three possible explanations of this r- reflex: (a) as a late fusion of certain čV- morphemes to the following roots in T; (b) as a reflex of one or more of the following PMx clusters—provided such clusters existed: *ty, *θy, *ⁿdy; and (c) as an allophone of PMx *l in certain environments.

Of these three explanations, I believe that the latter two are less plausible. Alternative (b) again raises the possibility of reconstructing certain PMx clusters consisting of dental consonant plus *y; it would imply that the T r is of the same origin as the M and C 'palatalized' reflexes described in the preceding section. But I hope to show that alternative (a) is a wholly satisfactory explanation of the origin of T penultimate r-. If this is satisfactorily established, it will have been demonstrated that such PMx *Cy clusters need not be assumed in reference to T at this point. There is, in fact, no need at any point to assume such clusters in reference to T. This makes it increasingly probable that the fusions posited in the preceding section are M and C developments.

Alternative (c) is mentioned here because of the statement in the closing paragraph of 2.1.4.4. to the effect that "the PMx lateral may have had a range of articulation that included certain 'r'-colored allophones." However, the positive argument for alternative (a)—if conclusive—would establish that the T r in penultimate syllables arose as incidental to certain middle or late T fusions, and that consequently no tie-in of T r in this position with PMx *l is to be posited. To this positive argument for alternative (a) I now turn.

4.2.6.1. Some instances of T rV- undoubtedly reflect recent fusions of čV- morphemes to following stems. The clearest instances of this development are those involving fusion of čV- morphemes to Spanish loan words: re^{2}kwa^{3} hoe (< čų^{3} wood + sp. coa hoe), ru^{3}gu^{3}ci$^{5-3}$ cross (< čų^{3} wood + Sp. cruz cross). Also of very probably recent origin is ra^{3}čų$^{1-2}$ bread (ča^{3} tortilla + čų$^{1-2}$ box or oven) in that it represents fusion of a descriptive phrase invented to describe a new cultural item introduced into Trique culture sometime within the past three or four centuries.

On the basis of the above indisputable cases of recent fusion, it seems safe to assume that such cases as the following with T r- are recent (i.e., middle or late T, rather than PT) fusions of this

sort: (121) $re^3ka?a^{4-3}$ stick ($\check{c}\varrho^3$ wood + $ka?a^3$). (236) re^3koho^{4-3} leaves ($\check{c}\varrho^3$ wood + $koho^3$ herb, plant). (239) re^3ko^{4-3} anona ($\check{c}u^3h$ fruit, oval-shaped + ko^{4-3}). (183) $ru^3gwi^3?i^3$ peach ($\check{c}u^3h$ fruit + $gwi^3?i^3$ —the latter with M cognate meaning plum). (16) ru^2ne^3 avocado ($\check{c}u^3h$ fruit + constituent meaning 'avocado' in M, C, T). (17) ru^3ne^{4-3} beans ($\check{c}u^3h$ fruit, oval-shaped + constituent meaning 'beans' in M, C, T). (129) $\check{z}i^3$ $-ru^4kwa^4$ rib ($\check{c}u^3h$ fruit, oval-shaped + constituent meaning 'rib' in M, C, T). (7) $ri^3c\varrho^3$ a drop of ($\check{c}u^3h$ oval-shaped + root ranging in meaning from 'breast' to 'drop' in M, C, T cognates). (166) $ri^3\varrho^{3-4}$ face of, surface of ($\check{c}u^3h$ oval-shaped + $y\varrho^{3-4}$ face). (250) ri^3o^{4-3} trough, measure, manger ($\check{c}u^3h$ oval-shaped + yo^{3-4}). (2) ri^3ki^3 stomach ($\check{c}u^3h$ oval-shaped + ki^3).

The above hypothesis accounts for eleven of the occurrences of T r- in penultimate syllables. Notice that in the above, the vowel u of the fused $\check{c}\varrho^3$ or $\check{c}u^3h$ is treated rather regularly in that (1) nasal quality is dropped when present; (2) there is resultant vowel i before c, y, and ki; (3) there is resultant vowel e before k; and (4) there is resultant vowel u elsewhere.

The nine instances of T r- as yet unaccounted for in the above paragraph are found in sets 47, 64, 69, 93, 130, 201, 246, 278. It seems very probable that in these T forms there has also occurred fusion of some T čV- morpheme to a following stem—even though we cannot now identify the fused element. I nevertheless list them here separately since it is to these sets that one would have to appeal if he were to argue for alternatives (b) or (c) above. 4.2.6.2. It is of some interest here that reduction of $\check{c}\varrho^3$ wood or $\check{c}u^3h$ oval-shaped to phonologically dependent elements of the general rV- type involves some phonological developments of PT *u, and *a that elsewhere have no parallel in T. This characteristic 'r' effect on vowels carries through the ultimate syllable in the T of two sets: (121) $re^3ke?e^{4-3}$ splinter ($c\varrho^3$ + $ka?a^3$); (130) $\check{z}i^3ri^3$ ki^{1-2} grasshopper (čV- unidentified element + kwa^{1-2}). In respect to the first example there exists a similar form $re^3ka?a^{4-3}$ stick which is assumedly from the fusion of the same two elements as $ke^3ke?e^{4-3}$ splinter. In respect to the second example, there exists in set 129, a form involving fusion of some čV- unidentified element with another -kwa stem ($\check{z}i^3$-ru^4kwa^4 rib) but without the 'r' effect in the ultimate syllable. It seems reasonable to believe, then, that the examples of 'r' effect in ultimate syllable resultant on 'r' effect in penultimates, occur in forms borrowed from some T dialect (group of idiolects) having this characteristic; while the forms $re^3ka?a^{4-3}$ stick and $\check{z}i^3$- ru^4kwa^4 rib without such consequent 'r' effect in the ultimate syllables represent the dialect

(group of idiolects) from which the majority of our forms come.
4.2.7. Penultimate reflexes of PMx *tn- and of PT žd-.
4.2.7.1. There is clear evidence in the M dialects that the *tn cluster existed in PM penultimate syllables as well as in ultimate syllables (see 3.1.3.2.). There also occurs in one set a T zn- penultimate cluster which is assumed to be from the same source, and which parallels the penultimate reflexes of *tn in the M of this set. On the strength of this one set (22) I posit PMx penultimate *tn. The M reflexes of *tn are M-SM, J, M t; M-SE N: (22) M-SM, J, M tų̄ʔų̄, M-SE Nų̄ʔų̄ word; T znę^{3}ʔęhę$^{4-3}$ conversation, zna^{3}h- (proclitic) language.
4.2.7.2. PT *žd is posited as source of T zd. This cluster has no clear PM parallel—although an st cluster has arisen in M-SM, SE by fusion of sV- morphemes to *t- initial stems. Possibly žd arose in PT by fusion of čV- morphemes to *d- initial roots. This fusion of *čV- + *d- > *žd in PT would give then, a phonological result quite different from later fusions of čV- morphemes—which, as just described, give rV-. (244) zdu^{3}kų$^{4-5}$? nephew. (271) zdu^{3}ku$^{4-3}$ necklace. The latter set might possibly reflect a fusion of the statistically frequent classificatory noun ču^{3}h fruit, oval-shaped with the stem du^{3}ku$^{3-4}$ to play.
4.3. PMx vowels in penultimate syllables. Only *i, *a, *ɔ, and *u occurred in PMx penultimate syllables.
4.3.1. Non-nasalized reflexes.
4.3.1.1. PMx *i gives M, C, T i in most phonological situations in penultimate syllables. There are, however, specially conditioned reflexes in the three languages: (1) M-SM, SE has reflex ï before ï in the following syllable except that SM yi(kï) occurs corresponding to SE yï (kï) as reflex of PMx *yi-. M drops *i after *k^{w} > ku, and this ku further assimilates to ko preceding Co in the following syllable. There is also an instance of *θi > šų(ʔų) pursuant to the regular phonological restriction that there be only one vowel quality in CVʔV couplets. (2) C has i/e reflex (See 3.2.1.1.) after *t and *x; and u reflex before following labial. (3) T has u reflex before labials; drops the *i after k^{w} > gu-, and assimilates *i > ę in CVʔęhę (pursuant to a regular restriction that only one vowel quality occurs in words of CVʔVhV pattern). (26, *ki- in M, *wi- in C, and *ni- in T) M-SM kīnī disgusting, repulsive; C tū-vīīnú to disgust; T ni^{3}nïhï$^{4-3}$ disgusting. (74, with *yi- in M, and *θi- in T) M-SM yīkī̄, M-SE yīkī̄ bone, shell, horn; T zi^{3}kï^{2}h shell (of an egg). (273, with *wi- in M and *ti- in T) M-SM vílū; T ži^{3}lu^{3} cat. (10, with *^{n}di- in M, with *ti- and *xi- in C) M-SM ^{n}dį̄hį̄, M-J ^{n}dičį wing (the nasalization of the penultimate vowel is a regular assimilation to nasal quality of the following

repeat vowel across h); C ʔtēēčē to untie, hēèčè wing. (28, with *kʷi- in M, C, T) M-SM kūnì to see, kūnī (sòʔō) to hear; C kwíínó to look at; T gu^{3}nï^{3} to hear. (94, with *ki- and *ⁿdi- in M, *xi- in C, and *ti- in T) M-SM kīvì day, ʔā-ⁿdívī the heavens; C hūūvē day; T gwi^{3} day, žu^{3}gwi^{3} name-of. (23, with *θi- in M, T) M-SM šų̀ʔų́ money, bit, šų́ʔų́ bright, shining; T zą^{3}ʔąhą$^{4-3}$ money, ząhą^{3} bit, mi$^{1-2}$ copper-colored, yellow, zi^{3}-mi$^{1-2}$ (ču^{3}h) yolk (of an egg). (102, with *ti- in M, C) M-SM stívī, M-J sa-tivi to err, to destroy; C dā-tùùvī to destroy. (226, with *yi- in M, *θi- in C, and *ⁿdi- in T) M-SM yūʔū mouth; C dūūvī mouthful; T du^{3}ʔwa^{3} mouth. The latter set is striking, in that the u~u~u would initially lead one to posit *u, but the fact that *u > C i before labials, while *i > C u before labials is decisive here. (81, with *ⁿdi- in M and T) M-SM ⁿdīšì cane-whiskey; T di^{3}ci$^{3-5}$ʔ/ciʔi^{3} cactus-beer.

4.3.1.2. PMx *a gives M, C, T a in most phonological situations in penultimate syllables. There are, however, the following specially conditioned reflexes: (a) In M, (1) there is loss of *a after *kʷ > ku (with passage of kuCo > koCo); and preceding M-SM, SE -taa (but *a > i(ta) in this environment in M-J). (2) There is a reflex e after M-SE h, and in the M-SM, SE situations nd...y and ñ...ñ. (3) There is reflex ʔi(ñu) of PMx *ya-, and M-SE reflex ye(Nu) of the same. (4) There are reflexes ʔu(ni) and ʔi(ñu) of PMx *wa. (b) In C, (1) dii-/dee-, hii-, and ʔii- occur as reflexes of *θa, *xa, and *wa respectively before C -no/-nu. (2) hii- also occurs as reflex of PMx *ya- before C -va < PMx *we (but not before any other proto labial consonant and vowel combinations). (3) kuu- occurs as regular reflex of PMx *kʷa-, except that kaa- occurs preceding either -ʔwa or ʔa < *ʔwa. (c) In T, (1) ži- and di- occur as reflexes of *ta and *θa respectively before č, c, n, y, or (y)a, (the latter from *ya; *ta-plus *-ya > žia and *θa- + *ya > dia). Similarly ni- occurs as reflex of *na- before (y)a (*na- + *-ya > nia). (2) du- occurs as reflex of *θa before labials; and yu- as T-Co reflex of *ya in the same environments.

Illustrative sets follow: (123, with *ka- in M, C, T) M-SM kākā; C káákā; T (g)a^{3}če$^{2-1}$ to walk. (116, with *kʷa- and *xa- in M; with *ka- and *ⁿda- in C; and with *ta- and *ⁿda- in T) M-SM kʷākā, hákā, M-SE kʷēkā, hékā to take away; C kā-ʔkáákā to operate (something), ndāàkà to get, to find; T ža^{3}ka$^{3-4}$h to take, to get, to fetch; na^{3}ka$^{3-4}$h to gather up. (59, with *kʷa- in M, C; with *ka- in T) M-SM kūčī to take a bath; C kā-ʔkúúná to bathe someone; T ga^{3}ne$^{3-4}$ to take a bath. (254, with *kʷa- in C, T; with *na- in T) C kūùnò to plant, to sow; T gu^{3}nų$^{3-4}$ to plant, na^{3}nų$^{3-4}$ to dress oneself. (261, with *ⁿda- in M, and with *ta- in T) M-SM,

SE ^{n}dē?yù, M-J ^{n}da?yu mud; T ži^{3}?yo$^{1-2}$ mud hole (230, with *^{n}da- in M, and with *na- in T) M-SM, SE ^{n}dēyū, M-J ^{n}dayu; T ni^{3}a$^{4-3}$ dinner. (169, with *ña- in M, and with ambiguous reflex of *ña- or *ya- in T) M-SM, SE (no M-J data) ñēñū; T a^{3}tą$^{4-3}$ blackberries. (174, with *ya- in M, T) M-SM tī-?īñù, M-J ?iñu; T a^{3}tą?ą$^{4-3}$ foam, suds. (111, with *xa- in M-SM, J; with *ya- in M-SE) M-SM hānù, M-SE yēNù, M-J čatų box. (31, with *wa- in M, C, T) M-SM ?ūnǐ; C ?īǐnù; T wa^{5}?nï^{5}h three. (24, with *ña- in M-SM, SE; with *ya- in M-J; with *θa- in C, T) M-SM, SE ñānǐ, M-J yani brother of a man; C ?dǐínó brother; T di^{3}nī$^{2-1}$ brother. (27, with *xa- in M-SM and in C; with *ya- in M-J; and with *θa- in C as well) M-SM tǐ-hánǐ, M-J (se?e) yani grandson; C (dāǐyā) déénó granddaughter, (dāīyā) hǐínó grandson. (66, with *ya- in M, C; with both *ya- and *θa- in T.) M-SM yāū; C hīǐvà; T-Ch du^{3}we$^{3-4}$/w·e^{3-4-3}; T-Co yuwi century plant. (182, with *k^{w}a- in M, C) M-SM, SE k^{w}à?ā, M-J ku?va brother of a woman, sister of a man; C kāā?vā brother. (106, with *θa- in M, T) M-SM, SE stāà, M-J, M šita; T da^{3}ča$^{2-1}$/ča^{3} tortillas. (107, with *ya- in M-SM, SE; with *ta- in C, T) M-SM, SE yātà back; C táátá tile; T ži^{3}ča$^{2-1}$ back of, roof of. (167, with *ya- in C and with *ta- in T) C yāānā net-work bag; T n·a^{3}h net-work bag, ži^{3}ną^{2}h crop (of a bird). (170, with no penultimate syllable in M, C; with *ta- in T) M-SM ñūù; C yą́ą̀; T ži^{3}ą^{2} village.

4.3.1.3. PMx *ɔ gives varying reflexes in penultimate syllables in the three languages. The most common reflex in M, C is u. However, in M, *ɔ > ǐ before Cǐ (except that ñi(tī) occurs in both M-SM, and SE); *ɔ > o before Co; there is loss of *ɔ following *k^{w} > ku; and *ɔ > i following *k, *w, and *k^{w} > k^{w}. In C, *ɔ > a following *k, and in the situation C kw...ku. In T, the most usual reflex is a; but du- occurs as reflex of *θɔ preceding a T labial; and yu- occurs in T-Co as reflex of *yɔ preceding w—when the latter is, in turn, a reflex of *^{n}g^{w}. (264, with *yɔ- and *ñɔ- in M, with *^{n}dɔ- in C, and *θɔ- in T) M-SM yūčǐ something powdered, ñǐtǐ́ sand; C (yą?ą́) ndūùtè? sand; T ču^{3-4-3} powder, da^{3}ču$^{4-5}$ (čų^{3}) sawdust. (76, with *yɔ- in M, C, with *θɔ- in T) M-SM yǐ̄kį̄, M-M ?ikį; C yúúkū, yūùkù?; T da^{3}ką$^{2-1}$/ką^{3} squash. (240, with *yɔ- in M and *tɔ- in T) M-SM yōkò:, T ža^{3}ko^{3} honey-bee, honey-comb. (48, with *k^{w}ɔ- in M, C, T; and with *^{n}dɔ- in C also) M-SM kūū exist, to be able; C kūūvē to complete, ndūūvē (?vīīkū) to bless; T ga^{3}wį^{3} to be, to become. (This set would be ambiguous as to *k^{w}ɔ- in M, C, T vs. *k^{w}a in M, C, with *ka- in T, were it not for the definitive occurrence of C nduu- reflex of *ndɔ-). (208, with *k^{w}ɔ- and *xɔ- in M; and with *tɔ- in T) M-SM k^{w}ǐsō, hísō to puncture; T ža^{3}ta^{2}h, to sting (of scorpion, wasp, bee). (217, with *kɔ- in M-SM, SE; with

*k^{w}ɔ- in M-J and in C; with *θɔ- in T) M-SM kìkū, M-J k^{w}iku to sew; C (kā ʔmą̀) kwāākū to swear, to testify; T da^{3} ʔnga ʔa$^{4-3}$ scar, proof. (14, with *^{n}dɔ- in C and with *θɔ- in T) C (kūūvē) ndúúkù to be joined; T du^{3}gwi$^{3-4}$ʔ together with, companion, neighbor, relative. (94, with *yɔ- in M and T) M-SM ffà-yīvī; T-Ch gwi^{3-5-4}, T-Co yuwi, T-I ngwi people.

4.3.1.4. PMx *u gives M, C, T u in most phonological situations. In M, *u > ī and o respectively before a following syllable containing either of these vowels. Except for the above situation, M, ti and ʔi occur as reflexes of PMx *tu and *yu before M č, n, s, or y. In C, *u > i before labials (including C -ko and -ku), while *^{n}du > nii (nǫ) but to nu̱u̱ (nę) — with the nasalization presumably a C development. In T *u > i before č and (ʔ)n. The C reflex i before labials is definitive for *u in sets where it occurs; for, while *a and *ɔ are little affected by a following labial — except that *ya(we) > C hii-, and while *i > C u before labials, only *u regularly gives C i in this situation. (234, with *yu- in M, C, and with *tu- in T) M-SM yūtù; C ī- ʔyúútù tump-line; T ži^{3}čo ʔo$^{4-3}$ the little straw-mat on the tump-line. (209, with *yu- in M, C and with *tu- in T) M-SM ʔīsù deer; C ʔyúúdù ʔ horse; T žu^{3}ta^{3}h deer. (73, with *yu- in M and C) M-SM yíkí; C ʔyūūčìʔ cubit (measure). (200, with *yu- in M, C, and with *tu- in T) M-SM tī-yókó, M-J tyoko ant; C ʔīīkō louse; T žu^{3}kwa^{3} ant. (101, with *tu- in M, C, and PT *ždu-) M-SM tīʔvī M-J tiʔvi to suck, to suck blood, to practice witchcraft; C tīīʔvī to suck; T zdu^{3}ʔwaha$^{4-3}$ witchcraft. (16, with *tu- in M, and *^{n}du- in C) M-SM tìčī; C nu̱u̱nę̱ avocado. (37, with *^{n}du- in M, C, T) M-SM nūnì; C nú̱ú̱nǫ́; T di^{3}ʔnï$^{2-1}$/ ʔnï$^{1-2}$ corn. (180, with *yu- in M, C, T; with *θu- also in T) M-SM yūʔà; C ʔíívà; T-Ch du^{3}ʔwe$^{3-4}$h/ ʔwehe^{3}, T-Co yuʔwih thread. (77, with *yu- in M, C; with *tu- also in C) M-SM yūkū mountain; C hīīkù hill, tííkó a little hill; ʔtííkù top, summit.

4.3.2. Nasalized reflexes.

4.3.2.1. Occasion has already arisen in the preceding section (4.3.1.4.) to take account of the nasalized reflexes of penultimate *u in the C of a few sets. Thus, in sets 16, 17, and 37 — the only sets involving reflexes of PMx *^{n}du before C n — nasalized reflexes nu̱u̱ (nę) and nii (nǫ) were cited with the remark that 'the nasalization was presumably a C development'. This remark was based on the observation that, although our data are admittedly very limited, all the penultimate reflexes of PMx *^{n}du- before C n are thus nasalized. This statement must remain, however, a presumption in that it may be that only cognates involving PMx *^{n}dom (See 3.2.2.5.) happen to have survived in C.

4.3.2.2. There are a few sets in which the M and/or T penultimate

syllable vowel reflex could be most easily rationalized by assuming the presence of PMx syllable-final *-m. Set 157 is especially crucial here: M-SM ñū?mà, M-J yu?ma; C ?yą̄ą̄?mē smoke; T yo^3 $?o^{5-3}$ gummy deposit made by smoke from a wood fire. The M, C, T cognates of this set do not have nasalization in the ultimate syllable; nevertheless the C penultimate syllable is nasalized and requires that we reconstruct vowel quality *a. By assuming PMx *ñ/yam- in M, C, and T, both the M ñu- and the T yo-(*ñ/yam- > yu- > yo(?o) are easily explained and the set may be shown to have the same penultimate syllable (with *ñ/*y alternation) in the three languages. A similar case, in 159 is not as conclusive in that the nasalization in the penultimate may be resultant on nasalization in the ultima: M-SM ñų̄?ų̄; C yą̄?ą̄?; T yo^3 $?o^{1-2}$ land, soil. In two other sets, no systematic way can be found to account for M u vs. C a except on the assumption that *am/*a was present in the PMx penultimate syllable, and that *yam- > M yu-: (50) M-SM (kōð) yúčí alligator; C ?yáátɛ́ lizard. (85) M-SM yūhą̄; C yāàčè dough. Thus the hypothesis that at least some PMx vowels occurred with *-m in penultimate syllables is attractive in that it makes it possible for us to identify as essentially the same—except for presence or absence of *-m—the otherwise disparate penultimate elements of a few more sets. It should be remembered, however, that there undoubtedly are a few sets reflecting disparate penultimate syllables.

Note that the hypothesis outlined in 2.1.4.3. concerning the origin of PMx *^{n}d, *^{n}g, *^{n}g^w, and *ñ requires the assumption that from pre-PMx to PMx all *m/*n plus consonant sequences (in pre-PMx *CVm-CV units fusing to PMx *CVCV) were reduced by loss of preceding nasal except those clusters surviving as the above complex phonemes. This hypothesis can be retained, in spite of the reconstruction of PMx penultimate post-vocalic *m in a limited number of forms, if we assume that these penultimate *CVm elements here in question were fused to following *CV forms within the PMx period itself, rather than in the transition from pre-PMx to PMx. In view of the fact that fusions of CV-CVV to CVCV are still taking place in the M dialects (see 163, 204, 255), such a development within PMx is be no means unlikely.

4.3.2.3. In the C of a few sets there occur etymological doublets in which the 'same' penultimate syllable occurs both nasalized and non-nasalized: (59) C kų̨́ų̨́ná to take a bath vs. kā-?kúúná to give (someone) a bath. It seems likely that the nasalization is a C development in such sets.

NOTE

1. See note 1, p. 53.

5. PMx glottal-stop

5.0. Preliminary considerations.

5.0.1. There has been considerable historical interplay between *? and tones— especially in T. The development of the T-Ch tone system of five levels is directly consequent on the disappearance of final *? from forms bearing PMx and PT tone *1. In turn the T split of *? into zero, ? and h is conditioned to a large degree by the tones(s) of the preceding vowel. Again, T metathesis of *? from old *?C medial clusters to final position in the form is conditioned by the reconstructed tone(s) of the form in which the *?C cluster occurred. While the interplay of *? and tones is not so evident in M and C, in C, at least, one tone pattern (mid-mid low) is found chiefly on words of certain tone classes reconstructing with final *-?. It is necessary, then, to anticipate in this section the tone reconstructions presented in section 6.

5.0.2. PMx *? characteristically occurred in two positions: preceding the consonant of the ultimate syllable and/or final in the ultimate syllable. A third position of occurrence—not explicitly mentioned heretofore—was that of an intrusive element interrupting the vowel of the ultima. In that the latter may seem to imply a somewhat novel analysis, I present here somewhat at length my reasons for adopting it[1]: (a) the consonant of reconstructed *CV?V sequences reconstructs like the consonant of any ultimate syllable —except for certain developments in T (where, upon becoming disyllabic by regular development, CV?V units are subject to the restriction that a fortis consonant or affricate does not occur in the C position since the new CV- syllable is now penultimate and these consonants are restricted to ultimate syllables). In the array of cognates in 7., I group together *CV?V and *CV reconstructed forms under the same *CV rubric. This arrangement, first adapted as a practical scheme for filing the comparative data, was evolved before I realized that the analytic implications of my procedure lay in the direction of considering these *CV?V sequences to be monosyllabic. (b) The *CV?V unit seems to have had a phonetic timing approximately the same as that of *CV(±?). Evidence

for this is seen in the M and C CVV reflexes of PMx *CV forms. In M and C, such CVV forms (<*CV) have approximately the same phonetic timing as CV?V forms (<*CV?V). Both CVV and CV?V now pattern as disyllabic in M (because of their structural parallelism to M CVCV), while CVV patterns as monosyllabic in C and CV?V as disyllabic in that language; nevertheless the similarity of timing between CVV and CV?V forms is preserved in both languages. In T, CV?V disyllabic forms (<*CV?V) are phonetically [CV?V·] and CV(<*CV) forms are phonetically [CV·] so that these two sequences do not have the same timing. In accounting for these phonetic differences in T as to the phonetic timing, I assume the following: (1) PMx *CV and *CV?V had approximately the same timing; both were monosyllabic and approximately two phonetic moras in length. PMx *CVCV was phonetically *[CVCV·] with the final syllable two moras in length, except that *CVCV? was phonetically *[CVCV?] — without this length on the ultima. (2) In M, PMx *[CVCV?]>[CVCV] so that CVCV forms with short ultimate now existed. Other *[CVCV·] forms from PMx *CVCV were now analogically shortened on the ultima. (3) The result was that M [CV·], [CV?V] and [CVCV] became markedly structurally parallel and the former two were now interpreted as disyllabic. Thus originated the typically disyllabic structure of M. (4) In C *[CVCV(?)]>[CV·CV(?)] with length shifted to the first syllable pursuant to the fixation of the phonetic stress to that position; in this way the typical C CVVCV structure evolved (the length became phonemic in that due to certain obscure factors CVCV forms were also developed). The result was that [CV·] > CVV in C but the unit was still interpreted as monosyllabic while CV?V (parallel to CVCV) was interpreted as disyllabic. (5) In T the old timing of [CVCV·] was preserved and extended to *CV?V which now became [CV?V·]. Length did not become phonemic but was now an automatic feature again—as in PMx. I have sketched the above argument rather fully in order to demonstrate that, in spite of the fact that reflexes of PMx *CV?V are invariably disyllabic in M, C, T, nevertheless the theory that most conveniently accounts for this development is one assuming an original monosyllabic *CV?V structure in PMx. (c) The above arguments only lead us, however, to interpret PMx *CV?V as monosyllabic; they do not of themselves establish my statement that such syllables consist of one phonemic vowel interrupted by *-?-. In supporting this further statement, I point simply to the fact that the two phonetic vowel moras were always of the same quality, that we elsewhere do not have vowel clusters—geminate or otherwise—in PMx,

and that these considerations lead one to interpret the two vowel moras as comprising but one vowel phoneme.

5.0.3. It is possible that PMx *? occurred in two further positions in addition to the three already mentioned. I discuss and illustrate these two further positions here and will henceforth refer to them no more in this section. In regard to both of these two further positions, the data are sufficiently scanty that they may be exhaustively presented: (a) *? may have occurred before the consonant of the penultimate syllable. There is but one set to substantiate this, and this one set may simply involve parallel C, T innovations in respect to this feature: (10) C ndūūčī to awaken (oneself) n?dùùčī to awaken (someone); T $na^3čí^3$ to awaken (oneself), $hna^3čí^3$ to awaken (someone). The h- element in T —here regarded as a possible reflex of PMx *?- in initial position—patterns as an allomorph of du^3- causative. In that the h- allomorph is very rare (only being recorded here and on one other n- initial verb), it may be an archaism rather than an innovation. The C ?- prefix (with regular metathesis of ?- + nd- > n?d) is, however, a very common C morpheme labelled non-reflexivizer by Davis and Walker, and very parallel in function to the T {du^3-} causative with its rare h- allomorph. (b) *? possibly occurred as the sole consonant initiating an ultimate syllable, i.e. in *?V as well as in *?CV syllables. To substantiate this there is but one set (which involves alternation with *n-): (104) M-SM, SE ?ɨ̀ɨ̀, M-J ?ɨɨ; C nɨ̄ɨ̄; T-Ch $?ɨ^4$, T-Co ?ɨ, T-I n'ɨ nine.

5.0.4. In the following paragraphs, I discuss in order (1) reconstruction of PT *? by internal reconstruction in T-Ch. (2) M, C, T reflexes of PMx final *-?. (3) M, C, T reflexes of *? in PMx *?C clusters initiating ultimate syllables. (4) M, C, T reflexes of *? interrupting the vowel of the ultima. (5) M, C, T reflexes ambiguous as to (3) vs. (4). (6) A small residue of four sets in which C presence of *? is irreconcilable with T lack of witness to *?.

5.1. Internal reconstruction of PT *?.

5.1.1. There are many words in T which, in phrase-final position, have a ? or h interrupting the vowel of the ultimate syllable. These words vary to ?- final and h- final respectively in phrase-medial. Such alternations, therefore, as the following occur: $yaha^3$ flower, but ya^3h $ži^3nga^2$ nasturtiums; $yo?o^3$ year, but $yo^3?$ $ga^3čɨ^{2-3}$ the past year; $na^3kɨhɨ^{4-3}$ atole, but $na^3kɨ^4h$ ru^4ne^{4-3} bean-atole; $re^3ko?o^{4-3}$ a forest, but $re^3ko^4?$ $ga^5tɨ?ɨ^{5-3}$ a thinned out forest. This variation of ?/h- interrupted syllable to ?/h- final syllable parallels a similar alternation of tone on T words; e.g., $na^3kɨhɨ^{4-3}$

~na^{3}kį^{4}h parallels ru^{3}ne$^{4-3}$ ~ru^{3}ne^{4} in the following: ru^{3}ne$^{4-3}$ beans, but ru^{3}ne^{4}a^{2}wa^{3} haba-beans. A further parallel is the variation of tones$^{1-2}$ to $^{2-1}$ in such expressions as ku$^{1-2}$ bone but ku$^{2-1}$ a^{3}wi^{3} skull. Notice also te^{2}ʔloho$^{5-4}$ rooster but te^{2}ʔlo^{5}h l·i^{3}h a little rooster; gwi^{3} žą$^{5-3}$ the eleventh day (gwi^{3} day), but žą^{5} gwi^{3} eleven days; yą$^{3-4-3}$ salt, but yą$^{3-4}$ ʔu$^{1-2}$ coarse salt; gwi^{3-5-4} people, but gwi$^{3-5}$ za?a$^{5-3}$ nice people. In brief, all these alternations may be summarized as follows: Phrase-final variants are characterized by a 'strike' of the tones in the direction of tone 3, and by an extra mora of vowel beyond the otherwise final ʔ/h; these features do not characterize phrase-medial variants.

To account for the above I offer the following hypothesis: (a) There existed in PT some sort of -V^{3} enclitic particle which marked the end of the noun phrase. (b) This particle once had a characteristic vowel quality which is now completely lost in T-Ch by assimilation of the particle to the vowel quality of the preceding stem vowel. (c) In T-Ch, this particle fused with the preceding stem vowel as follows: (1) An extra mora of vowel length was added to ʔ/h-final forms—thus constituting anew for T interrupted vowels like those that had formerly existed in PMx. (2) No extra length was added to vowel-final forms, but (3) some indication of the tone 3 of the original particle was retained in that stems bearing 5 or 4 in the ultimate syllable received an up-glide to tone 3 or 4 (giving 5-4, 5-3, and 4-3 glides) while stems in 2-1 received some sort of down-glide and became 1-2. Comparative data for the T-Co dialect offers some corroboration of this internal reconstruction in T-Ch, in that T-Co has such parallels as the following in elicited isolated forms: T-Co nakuh-a; T-Ch na^{3}kįhį$^{4-3}$ atole; T-Co yuʔ-a, T-Ch yoʔo^{3} year. I have not written tone on the T-Co forms—in that I have not made an analysis of T-Co tone in its own right; nevertheless my rough field notes indicate that the tones of the T-Co forms parallel somewhat closely those of T-Ch. My notes indicate that T-Co does not have the up-glide towards 3 on words corresponding to T-Ch phrase-final ru^{3}ne$^{4-3}$ beans, but that particle -a^{3} is present instead. However, there exist in both T dialects some (VhV^{3}) phrase-final forms such as koho^{3} herb, and čehe^{3} path. It appears, then, that the T-Ch data present an advanced stage in the fusion of some such particle as -a^{3} marker of phrase-final, while in the T-Co data this fusion is only incipient.

The preceding internal reconstruction in T-Ch reinforced by some comparison of T-Co forms enables us to consider the phrase-medial forms as historically basic. I do not, then, consider forms with ultima interrupted by ʔ/h as historically relevant but treat

these for comparative purposes as ?/h final forms. Furthermore, T tone glides 5-4, 5-3, 4-3, 1-2, 3-4-3, and 3-5-4 I likewise regard as historically irrelevant and treat them for comparative purposes as 5, 4, 2-1, 3-4, and 3-5 respectively. This simplifies considerably, on the T side the task of tone reconstruction.

5.1.2. By internal reconstruction in T-Ch it is also possible to demonstrate that T ?, h and tones 2-1 are all reflexes of PT *?. We thereby considerably simplify the task of reconstructing the PMx *? in that we show that PT, like M and C has but one glottal phoneme. (M and C h is historically a velar spirant). Therefore although the argument for reconstructing T-Ch ?, h and 2-1 as PT *? is somewhat lengthy and involved, it cannot well be bypassed here.

T is characterized by comprehensive form classes that override the grammatical classification into noun, verb, adjective, numeral, and certain minor classes. These comprehensive form classes are pertinent to the distribution of the fused and semi-fused pronouns—enclitics added indifferently to nouns, verbs, and adjectives (and to a lesser degree to the numerals and certain particles). In describing the distribution of these enclitics one must take into account not only the tones of the words of a given comprehensive form-class but presence or absence of final ? or h in the phrase—medial forms of that class. It is therefore convenient to refer to these classes not simply as 'tone-classes' but as tone -?/h classes by such identifying tags as the following: 2-1, 3h, 3-4, and 3-5?. A listing of these comprehensive tone -?/h classes (omitting a few irregular stems which do not fit into the classification well) shows a slight tendency for ? and h to be in complementary distribution; in the following list I omit all vowel-final classes except 2-1 in that they are irrelevant to the mutual distribution of ? and h: 2-1/5h, 2h/4h, 3h, 3?, 3-4h, 3-4?, 4h, 4?, 3-5?/5?, 4-5?, 5h, 5?. Notice that in the above listing 2h occurs but not 2?, 3-5? occurs but not 3-5h. Furthermore, the large classes 3-4h vs. 3-5? (with 3-4? being a relatively small class) show the same tendency to complementation. Nevertheless, as the above list stands ? and h are in clear contrast in respect to 3h vs. 3?, 3-4h vs. 3-4?, 4h vs. 4?, and 5h vs. 5?. In the following paragraphs I purpose to show that these contrasts are not historically basic.

(1) The 3h vs. 3? contrast is largely resultant on development of Vh(V)^3 nouns from 3-4h stems, and of V?(V)^3 nouns from 3-5? stems. Notice, e.g., that the unpossessed ?weh(e)^3 <u>thread</u> has a possessed form du^3?we$^{3-4}$h—which I here assume to be the

historically more basic form in that the T penultimate du^{3}- reconstructs in its set (180) along with the M and C penultimates as a PMx penultimate, while the unpossessed form is typical of many T unpossessed forms which seem regularly to have been formed from possessed forms by dropping the PMx penultimate. I assume, therefore, that in the creation of such T unpossessed forms—along with the fusion of the V^{3}- particle described above—T smoothed out tones 3-4 to 3. Similarly, the unpossessed form ci?(i)^{3} cactus-beer (81) has a possessed form $di^{3}ci^{3-5}$? which again—on grounds identical with those presented for du^{3}?we^{3-4}h above—reconstructs as the historically more basic form, thus leaving ci?(i)^{3} as a more recent creation. This accounts for almost all the 3h vs. 3? overlap in our data. There is to be sure, a large class of 3h forms not reflecting the above development, but the instances of contrasting 3? forms apart from the above development are almost negligible (two stems, one of which appears in set 148). While the origin of the latter residue is obscure, it seems safe to conjecture that the 3h vs. 3? contrast is a comparatively recent development. It is not surprising—once the contrast was developed—that it should be extended in various obscure ways to other forms.

(2) The 4h vs. 4? contrast largely reflects a development parallel to that sketched above in that many of the 4h forms are T formations involving some preposed T CV- element and a CVh(V)^{3} form (<CV^{3-4}h) with lowering of the tone of the latter to 4(-3), while many of the T 4? forms are similar T formations involving preposed T CV- element and a CV?(V)^{3} form (<CV^{3-5}?) with a similar lowering of the tone of the latter to 4(-3). Notice, e.g., T $na^{3}k\underline{i}^{4}$h/$na^{3}k\underline{i}h\underline{i}^{4-3}$ atole which probably is a fusion involving PT *na water (144) and $k\underline{i}h\underline{i}^{3}$ dough (85, cf. possessed form da^{3} $k\underline{i}^{3-4}$h). Similarly, T $re^{3}ka^{4}$?/$re^{3}ka$?a^{4-3} stick is a fusion involving $\check{c}u^{3}$ wood (110) and ka?(a)^{3} (121, cf. ka?a^{3} pine wood, torch, candle, possessed form zi^{3}-ka^{3-5}?, and cognate verb na^{3} ka^{3-5}? to sweep, originally sweep with a bundle of twigs). Other T 3-4h(3) and 3-4?(3) forms reconstruct with PMx penultimate syllable and thus do not appear to be T formations. Nevertheless, in that these inherited forms belong to the same tone -?/h classes as do the similar forms which are clearly T formations, I regard them as likewise harking back to T 3-4h and 3-5?, respectively. The above development accounts for the majority of forms with 4h vs. 4? contrast. There is also contrast in the 4h vs. 4? adjective and numerals, but so many words in these grammatical classes

bear tone 4 or 5 that it seems safe to assume that historically such words represent forms belonging to various PT tone -?/h classes with subsequent grammatical leveling to their present tones. If ? and h were in complementary distribution with each other before the tones of the forms were leveled, then it is the leveling itself which has introduced the contrast here. There also exist some verb stems in 2h with potentials in 4h, but there are no 4? verb forms to contrast with them.

(3) Instances of 5h vs. 5? seem clearly to be resultant on the T grammatical development mentioned above in which adjectives and numerals derived from forms of originally different PT tone -?/h classes were lowered to 5 with retention of final -? or -h of the earlier form. This assumption is even more secure than that made above in reference to 4h vs. 4? in that there is no evidence that PMx or PT *44 tone pattern existed (which would presumably give T 55); therefore T words 55h and 55? must have developed from words formerly bearing other tone patterns. Such a development is clear in the case of verbs with potential in 5h or 5? in that the former have 2-1 (PT *1?, phonetically [*1h]) in their basic form and the latter have 3-5? in their basic form: $ga^{3}\check{c}i_{\dot{}}^{2-1}$ asked but $ga^{5}\check{c}i_{\dot{}}^{5}h$ will ask; $ga^{3}\check{c}i_{\dot{}}^{3-5}?$ buried, but $ga^{5}\check{c}i_{\dot{}}^{5}?$ will bury.

(4) Finally, the contrast of 34h and 34? must be considered. Here the historical development is not as simple as in the data considered in the above paragraphs. Nevertheless, an inspection of the 34h and 34? forms reveals fairly consistent complementation in terms of the preceding consonant (and possibly the vowel as well). The 3-4h class is much larger than the 3-4? class and the latter is almost entirely restricted to forms with ultimate syllable consonant(s) r, gy, and gw—which, in turn, do not usually occur within 34h forms (except for developed -g- between earlier T *u...w as in set 38). There is, however, some overlap in that one verb occurs with ultimate syllable $-wi^{3-4}h$ vs. another verb with ultimate syllable $wi^{3-4}?$, and one verb with ultimate syllable $na^{3-4}h$ vs. another verb with ultimate syllable $n\dot{a}^{3-4}?$. Nevertheless, in spite of this residue, it seems plausible that at a previous period in T, ? and h were in complementary distribution here—as, indeed everywhere else.

5.1.3. It remains to show that T 2-1 is a reflex of PT *?. T has a large class of 2-1 stems (varying to 1-2 in phrase-final). Not only do 2-1 verbs > 5h in the potential but disyllabic nouns in 3 2-1 > 5 5h in their possessed forms as well. There is then, a general morphophonemic connection between 2-1 and 5h. Presumably this connection points to a time when these stems were 'h' final (either

the spirant allophone of *?, or h phoneme already split off from *?) everywhere. Furthermore, 2-1 stems behave in many respects like -h final stems, e.g., in regard to their selection of the alloforms of the fused first and third person pronouns. Finally, the assumption that PT *1? (phonetically *[1h]) > modern T 2-1 is the theory on which I account for the development of the modern T-Ch five tone system. Without such an assumption it would be difficult to compare the T tones with the M, C tones and to reconstruct the PMx tones of our cognates. With such an assumption both the reconstruction of the PMx *? and of the tones are facilitated. The above arguments from internal reconstruction of T-Ch in regard to 2-1 stems are clinched, however, by the comparative data; for there are sets in which M and/or C give clear evidence of *? in forms cognate with T 2-1 stems (23, 24, 76, 77, 83, 110, 134, 159).

PT had, then, but one glottal phoneme, but the phoneme had a spirant allophone in certain situations and a stop allophone in other situations. To anticipate somewhat the tone reconstruction of the next main section, we may say that in reference to the PT four-level system, T at an earlier stage than the present had spirant allophone of *? after proto tones *1 and *2, a stop allophone after proto tone *4, and stop or spirant allophone after proto tone *3 depending on the preceding consonant and vowel of the syllable in which the *? occurred.

5.2. M, C, T reflexes of PMx final *-?. The essential developments of PMx final *-? have already been sketched in 2.1.3. I here recapitulate with amplification and illustrative data: (1) M loses final *? everywhere and without trace, except for the situation described under (4). (2) C preserves final *-? in some forms and loses it in others. Etymological doublets occur—so that one C form of a given word may have -?, while another form of the same word—often the form occurring non-phrase-final—does not have -?. This situation possibly indicates a PC sandhi pattern in which certain ? (space) consonant clusters were reduced by loss of the first member. Sets in which T preserves final *-? while C does not probably contain PC sandhi variants without the final *-?. C tone pattern mid-mid low, whether or not followed by final -?, usually indicates *22? or *33?. (3) PT regularly has preserved final *-? but splits it into -?, -h and 2-1 in modern T (see 5.1.2. and 5.1.3.) (4) in M, C and T there occur forms in which PMx *CV? has been expanded by rearticulating the vowel so as to produce disyllabic CV?V; in such forms the originally final *-? is preserved in any language where the expansion occurs.

Illustrative sets follow: (5) M-SM vīšǐ sweet, ^{n}dùšī honey; C nā-dī?ī honey (with rearticulation of root vowel); T zi^{3}ci?i$^{4-3}$ candy, ga^{3}ci?i$^{4-3}$ honey. (76) M-SM yīkᵠ; C yūùkù? summer squash; yúúkù squash (in names of several varieties), yūūkù squash (in name of another variety), yúúkù squash (in name of still another variety); T da^{3}kᵠ$^{2-1}$/kᵠ^{3} squash. Notice the C sandhi variants with and without -?, and the occurrence of C mid-mid low tone pattern indicative of PMx *22? in this set. Notice also the T 2-1, indicating PT *1?. T kᵠ^{3} either has lost *-? by analogy to the possessed form or is witness to a PMx variant without *-?. If the latter be true, then the PC sandhi variants with and without final *? reflect a situation current in PMx itself. (89) M-SM ^{n}dǐī in every place, completely, ^{n}dī?ī all, finished; C ndūū all; T nī^{5}? all. (Notice regular loss of final *-? on one M form, but preservation of PMx *? by rearticulating the root vowel in the second M form. C loses the *-?. T retains *-? and lowers the tones of this word (grammatically a numeral) to tone 5 from some undetermined previous tone pattern). (98) M-SM ñīñī; C yᵠúᵠ; T tᵠ?ᵠ^{3} ear of corn (with M, C loss of final *-?). (127) M-SM lāk^{w}ā, M-M dak^{w}a pus; C yāākwā? pus; T kwe^{3}h pus, la^{3}kwe^{3}h mucus, (zi^{3}u$^{3-4}$) da^{3}kwe^{2}h vulva. (155) M-SM kᵠùᵠ four; C kᵠùᵠ? four, kᵠūᵠ hāākū eighty ('four twenties'); T gᵠ^{5}?ᵠ^{3}h four, ngwᵠ^{4}?/ ngwᵠ^{4}?ᵠ^{3}h four more. (Notice again the evidence of PC sandhi variants with and without final *-?. T has rearticulated the vowel in most forms of the numeral; addition of T -h after the rearticulated vowel is obscure). (167) M-SM ñūnū; C yāānà; T n·ᵠ^{3}h net-work bag, T ži^{3}nᵠ^{2}h crop (of a bird). (Notice that the C form has no final -? but bears tones mid-mid low, which along with the M, T witnesses, reconstructs as PMx *22?). (199) M-SM, SE ^{n}dǐkī; T ni^{5}ka^{5}? short (final *? here was the factor conditioning PMx *ɔ > M ī; cf. 3.2.1.5.).

5.3. M, C, T reflexes of *? in PMx *?C clusters initiating ultimate syllables.

5.3.1. Reflexes of PMx clusters composed of *? followed by nasal or semi-vowel. Clusters composed of PMx *? followed by lateral, nasal, or semi-vowel were discussed and illustrated in 3.1.4. PMx *?l occurs, however, but in one set (19) and is not further considered here. In section 3.1.4., *?m, *?ñ and *?w were of some interest in view of the fact that under varying conditions in M, C, T the consonant following the *? was lost. In this section our interest focuses on the *? itself rather than on the consonant following it. We trace developments in which the *? of such *?C clusters is (a) retained in original position, (b) lost, or

(c) metathesized to another position so that the original *?C cluster is eliminated but with preservation of the *? elsewhere in the same form.

5.3.1.1. M clusters ?m, ?n, ?ñ, ?v, and ?y are, wherever they occur, reflexes of PMx *?m, *?n, *?ñ, *?w, and *?y respectively. However, M reflex *?n of PMx *?n is a rather rare reflex found only in three sets (32, 168, 275) under obscure conditions. More frequently the M reflex of this cluster is simply n.

5.3.1.2. C retains glottal stop in original position in these clusters except that (1) the *? of *?n is regularly metathesized to initial position in the penultimate syllable of disyllabic words (with ?- + nd > n?d), and (2) the *? of *?w is also thus metathesized in a few sets under obscure conditions. Under conditions almost as obscure the *? thus metathesized is lost from some forms. However, the loss of metathesized *?, both here and elsewhere in C, may be explained, at least in reference to some verb stems, as an analogical leveling of ?- from intransitive or reflexive verb stems in view of the fact that prefixial ?- occurs as a transitive or non-reflexive morpheme in many verbs (see illustration in 5.0.3.).

5.3.1.3. T sometimes retains *-? in original position in these clusters, and sometimes metathesizes it to the final position in the word—where it becomes h, ?, or 2-1 and may receive the phrase-final increment discussed in 5.1.1. Thus, the T metathesis of final *? was early enough so that the shifted *? shared in all the developments sketched for final *-? in 5.1.2. and 5.1.3. In thus metathesizing the *? of PMx *?C to the rear of the word, T reflects an opposite tendency to that found in C where the *? of such clusters is metathesized to the fore of the word. Since these metatheses are even more typical of the PMx clusters described under 5.3.2., the following C, T correspondence is of considerable importance for establishing PMx *?C cluster initiating an ultimate syllable: C ?CVVCV ~ T CVCV?/h/2-1 < PMx *CV?CV.

The conditions under which T retained *? in original position in clusters composed of *? followed by nasal or semi-vowel and the conditions under which T metathesized the *? of such clusters to final position are as follows: (1) PMx *? of such clusters was never metathesized when there was also a final PMx *-? present. (2) PMx *?C > T ?C in forms with PMx tones *(2)2, *(3)3, *43, *42 and PT tones *12 (merger of several PMx tone-sandhi variants), except that (3) PMx *?n > T n (with loss of *?) in forms with the above reconstructed tone patterns (but possibly remains T ?n in forms with PMx *43). (4) PMx *?C > PT *CV? (with subsequent

split of PT *? > ?, h and 2-1) in forms with PMx *23, *32, *24, *34 and PT *21 (PMx *21 tone-sandhi variant). (5) PMx *?m is treated in accordance with the above statements but the reflexes are complicated by the following course of development (mentioned in 3.1.4.2.): (a) Early PMx *?mV ±m(?) syllables seem to have given rise to late PMx alternants: *?Vm(?) in which the first *m was lost on addition of the second *-m; and *?mV(?) in which the first *m was retained in that a post-posed *m was not thus present on the form. (b) The former variant > M ?V; C ?ɣ(?); T ?ɣ(h). (c) The latter variant > M ?mV, C ?mV(?) and PT *?mV(?). (d) PT *?mV was probably metathesized to *mV? when subject to the conditions stated under (4) above. (e) However, PT *?mV? was simplified by loss of first *? so that *mV? also resulted. The above posited course of development requires us to assume that any T mɣ? forms occurring in our sets reflect a T nasalization, not PMx final *-m. Set 157 contains a T form $yo^{3}?o^{5-3}$ which apparently < PMx *?mV with tones *24, and is, therefore, impossible to rationalize in terms of the above scheme in that the ? has not been metathesized according to statement (4). However -?o is a somewhat bizarre reflex of PMx *?m and the factors conditioning it are rather obscure.

The following sets, while generally illustrative of M, C, T reflexes of PMx *?C clusters with nasal or semi-vowel, are chosen especially to illustrate statement (1) in the above paragraph. In the following, the PMx ultimate syllable had *?CV? structure and T, retaining the final *-?, did not metathesize the first *?: (274) M-SM kā?nù to break, to cut; T $ga^{3}?nī^{3-5}?$ to cut, to chop. (275) M-SM k^{w}ā?nū to grow, ká?nū large, ñá?nū great, aged; T $(ru^{3}ne^{4-5})$ $ga^{3}?nī?ī^{4-3}$ big (beans); $da^{3}?nī^{4-5}?$ uncle. (91) C nā-?nɻ́ní; T $na^{3}?nī^{2}h$ to open. (62) M-SM yú?ú, M-J yu?vi to be afraid; C kā-ndìì?và to frighten; dīɻ-?vā?à to be afraid (with preservation of final *? and rearticulation of ultimate vowel in the second C verb); T $žu^{3}?wi^{3-5}?$ to be afraid. (278) M-SM tē?yù; T $ri^{3}?yu^{3}h$ to spoil, to rot.

The following illustrative sets are chosen especially to illustrate (2) above; the PMx ultimate syllable had *?CV structure and T retains *? in original position in forms with the indicated reconstructed tone patterns. (21, tones *22) M-SM kā?mū, M-J ka?mi to burn something; C ?kɻ́ɻ́?mí to set fire to (first ?-in C form is C non-reflexive morpheme); T $(g)a^{3}?mą^{3}$ to be warm. (158, tones *33) M-SM hà-ní-čā?mà flattened; C dīɻ-sīī?má to flatten; T $(gi^{3})na^{3}?mą^{3}$ to cave in. (44, tones *33) M-SM tāù to owe (< PMx variant without *-?-; see 5.6.), ^{n}dá?ú to be poor; T

da^{3}?wi^{3} to owe. (96, tones *42) M-SM sɩ̀?ɩ̄ foot; C dɨ̨ɨ̨?mą̄ leg; T da^{3}?mą^{5} leg. (46, tones *42) M sàú (< PMx variant without *-?-; see 5.6.); Tzdu^{3}?wi$^{5-3}$ Indian, non-Spanish-speaking.

The following sets are chosen especially to illustrate statement (3) relative to *?n: (165, tones *33) M-SM ?ɪ̀nà dog; C ?yáánà dog, ?yɨ́ɨ́nà fox; T žu^{3}ne^{3} fox. (36, tones *12 in PT) M-SM kānī; C ?ką̄ą̄nɨ̨̄; T ga^{3}nɪ̄$^{2-3}$ to set up. (29, tones *43) M-SM ?īnī afternoon, šínī supper; C vɪ́ínɔ̀ afternoon; T zdi^{3}?nɪ̄$^{5-3}$ supper.

The following sets are chosen especially to illustrate statement (4); these exemplify the conditions under which T metathesized *? of PMx *?C cluster to final position: (38, tone *23) M-SM kū?ù sister of a woman; C kúú?vè sister; T žu^{3}gwi$^{3-4}$h sister of a woman (T developed -g- between *u...wi). (182, tones *32) M-SM k^{w}à?ā, M-J ku?va brother of a woman, sister of a man; C kāā?vā brother; T žu^{3}gwe$^{3-4}$h brother of a woman, sister of a man (T developed -g- in *u...we). (28, tones *24, *33) M-SM kūnɪ̀ to see (< *24), kūnī (sɔ̀?ō) to hear (<*33); C kwɪ́ínɔ́ to look at; T (n· e$^{3-4}$) gu^{3}nɪ̄?ɪ$^{4-3}$ mirror (<*24), gu^{3}nɪ̄^{3} to hear (< *33). (26, tones *34) M-SM kīnī disgust; C (kūūvē kāà) ?vīínō to be disgusted; T ni^{3}nɪ̄hɪ̄$^{4-3}$ disgusting. (24, tones PT *21) M-SM ñānɪ̀ brother of a man; C ?dɪ́ínɔ́ brother; T di^{3}nɪ̄$^{2-1}$ brother of a man.

The following sets are chosen especially to illustrate the developments sketched under (5): (22, tones *32) M-SM tɨ̨?ɨ̨ word (< PMx *-?Vm?); T (z) ną^{3}?ą̨hą$^{4-3}$ conversation, ną^{2}?ą̨hą$^{5-4}$ incantations (< PMx *-?Vm?), nu^{3}gwą?ą$^{4-3}$ word (< PMx *-?mV? > PT -mV? by loss of first *? and with subsequent passage of *m to w and development of -g- after u; the vowel nasalization is presumably a T development). (32, tones *32, *34) M-SM šɨ̨?ɨ́ money, bit (< PMx -*?Vm?); T zą^{3}?ą̨hą$^{4-3}$ money, (< PMx -*?Vm?), zi-^{3}mi$^{2-1}$ (ču^{3}h) yolk of an egg, mi$^{1-2}$ yellow, copper-colored (< PMx -*?mV? > PT *mV? by loss of first *?). (161, tones uncertain) M-SM tą́?ą̨ comrade, of the same class (< PMx -*?Vm); C ną̄?ą̨ a pair (< PMx *-?Vm); T yą^{3}?ą$^{5-3}$ twins (< PMx *-?Vm), a^{4}mą$^{3-4}$? a couple of (< PMx -*?mV with T metathesis; the vowel nasalization is presumed a T development), nu^{5}gwą^{5}? together with (as preceding, except for passage of *m > w and development of -g- after u). For further examples— especially those involving reflex ?m in M, C, T— see 3.1.4.2.).

5.3.2. Reflexes of PMx clusters composed of *? followed by stop or spirant.

5.3.2.1. Clusters of PMx *? followed by spirant or stop are

uniformly reduced in M by loss of *?. In C, the *? of such clusters is regularly metathesized to the penultimate syllable in disyllabic forms; in monosyllabic ?CVV(?) forms it is most often retained. Exceptions to both the above statements relative to C occur in that the C of some sets preserves no trace of PMx *?; the absence of *? in these C forms may be at least partially explained as an analogical leveling of *? from intransitive or nonreflexive verbs—as suggested in 5.3.1.2.

5.3.2.2. T sometimes loses the *? from such clusters, but more often metathesizes it to final position. The conditions governing these two different reflexes—zero and metathesized reflex—are similar to those stated for T in relation to the metathesis of *?in in 5.3.1.3., but the conditions here are somewhat simpler: (1) PMx *? was dropped from such clusters when there was a final *? present on the same form. (2) PMx *? was also dropped from such clusters in forms with PMx tones *(2)2, *(3)3, and *43. (3) PMx *?C > PT *CV? (with subsequent split of PT *? > ?, h, and 21) in forms with PMx tones *23, *32, *24, *34, *42 and PT *21 (merger of several PMx tone-sandhi variants). Notice that *?C clusters with stop or spirant as second member give a metathesized T reflex, i.e., CV? in forms with PMx tones *42; while *?C clusters with nasal or semi-vowel as second member give unmetathesized reflex, i.e., ?CV in forms with PMx *42. Otherwise, the conditions just posited and those posited under statements (2) and (4) of 5.3.1.3. differ only in that the conditions here posited do not embrace the same variety of PMx tone patterns as those under 5.3.1.3., nor do these conditions have the special complication in regard to loss of consonant (*m) that characterized those under 5.3.1.3. and which made necessary statement (5) in that section.

5.3.2.3. In terms of C, T correspondences, note again that where both C and T preserve metathesized *? of such clusters, the correspondence C ?CVVCV~T CVCV?/h/21 enables us to reconstruct *CV?CV with some assurance. Otherwise, however, the *?C cluster is reconstructed on the basis of simply the C or the T witness. In view of the fact that C seems to have added initial *? in some instances (notably in 157) there is probably a certain margin of error in the reconstruction of *?C based on the C witness alone, in that some such sets may involve addition of the initial ?- in C rather than a metathesized *? from original PMx *?C cluster. In that there is no clear evidence, on the other hand, that T has ever added final *-? to originally vowel-final forms, the T witness —even in the absence of ? in the C form—is somewhat more

valuable.

5.3.2.4. The following set illustrates statement (1) relative to T in the set of conditions stated above. In this set there are reflexes of PMx ultimate syllable *?CV? with *θ- as the consonant of that syllable. This is the only set in the array of cognates that unequivocably illustrates *?CV? with stop or spirant as the consonant of the syllable. This is not particularly strange in view of the consideration that while in order to reconstruct such a syllable we must have C ?CVVCV? or ?CVV? ~ T (CV)CV?, yet the PC final *-? is only sporadically preserved. We may assume, therefore, that PMx syllables of this sort may have been more frequent than the C ~ T correspondences indicate. (209) M-SM ?ĭsù deer; C ?yúúdù? horse; T žu^{3}ta^{3}h deer (For the semantic shift involved cf. A kaso mule, kaso hndai deer). The initial ?- of this form is probably not a C innovation resulting from the fusion of some C ?yu- element; on the contrary the penultimate syllables in M, C, T reconstruct quite regularly as PMx *yu- in M, C, and *tu- in T.

The following sets are especially chosen to illustrate statement (2) above; they illustrate conditions under which T dropped PMx *? from *?C cluster with stop or spirant as second member: (77, tones *22) M-SM yūkū mountain; C ?dáákó a pile, nā-hāākō slope; T da^{3}kᵠ^{3} slope (another T form with PT *21 has metathesized *?: da^{3}kᵠ$^{2-1}$ hill of corn, the nose (105, tones *22) M-SM kātā; C kāātā (with loss of penultimate metathesized *? in this intransitive verb); T ga^{4}ča^{4} will sing (new T potential from *22 lowered to *33, i.e., modern T 44; the other form of this verb, ga^{3}ča$^{2-1}$ sang is from PT *21 with metathesized *?). (200, tones *22/*33) M-SM tī-yókó ant; C ?ĭĭkō louse; ?yāākō fly; T žu^{3}kwa^{3} ant. (112, tones *43) C (kúúvé) ?yāàkà to slobber; T ga^{3}ka^{5} to leak.

The following sets are especially chosen to illustrate statement (3); they illustrate conditions under which T metathesized the *? of PMx *?C clusters with stop or spirant as second member: (135, tones *34) M-SM tĭ̄-sāà; C ?yáádá; T ža^{3}taha$^{4-3}$ bird. (142, tones *23) M-SM yák^{w}á; C ?kwéì crooked; T du^{3}gwa$^{3-4}$? to turn or twist downwards. (118, tones *23) M-SM tākà; C ?dáákà; T zi^{3}-ga^{5}ka^{5}? (bird's) nest. (116, tones *34) M k^{w}ākā to take away; C kā-?kááká to operate (something), ndāàkà to get, to find (with penultimate, metathesized *? lost here in this verb); T ni^{3}ka$^{3-4}$h to have, na^{3}ka$^{3-4}$h to gather up, ža^{3}ka$^{3-4}$h to get. (9, tones *42) M-SM kĭ̀hī fever; C dà-kààčī to boil; ?yūūcī to fry (with loss of metathesized *? in first verb); T ga^{3}či?i$^{4-3}$ fever.

(11, tones *42) M-SM yùhī to bury; C ?kūūčī to plant; T $ga^{3}č\underline{i}^{3-5}$? to bury. (123, tones *22, PT *21) M-SM kākā to walk; C káká to walk, kū-čììkà to take a walk (with loss of metathesized *? in these intransitive forms); T $ga^{3}če^{2-1}$ (< PT *21), $ga^{4}če^{4}$ (< PMx *22 lowered to *33, i.e., modern T 44, in creation of new potential) to walk.

5.3.3. Reflexes of PMx clusters composed of *? followed by prenasalized stop. The sets that unambiguously contain reflexes of these clusters are few enough that the data may be exhaustively listed.

PMx *?^{n}d occurs in two sets. M retains *? in original position; C metathesizes the *?, with loss in one set; T retains the *? in *?CV? syllable and loses it in *?CV syllable (which in this case bears reflex of PMx tone *33): (146) M-SM kā?^{n}jà to cut; C k^{w}ę́ę̀? (with *?- lost in po), ?ę́ę̀?, č?ę́ę̀?, nę́ę̀? to break; T-Ch ga^{3}?ne^{3-5}? to cut. (90, tones *33) M-SM kā?^{n}dì; C kūùnî (with loss of metathesized *?); T $ga^{3}nï^{3}$ to explode.

*?^{n}g occurs in four sets. The *? is lost in M; and metathesized in the C of one of the two sets for which there is C witness but presumably metathesized and lost in the other set. T retains *?^{n}g undisturbed in all four sets—three of which reflect PMx *?CV? ultimas and one of which reflects PMx *?CV ultima: (214) M-SM k^{w}ākù; T ga^{3}?nga^{3-5}? to laugh. (215) M-SM kākū; T ga^{3}?nga^{3-4} to be born. (217) M-SM kìkū to sew; C (kā?mą̀) kwāākū to swear; T da^{3}?nga?a^{4-3} scar, proof, sign. (218) C ?kāākù (nąą̀) to prepare little by little; T na^{3}?nga^{2}h to whittle; ga^{3}?nga^{2}h to scrape.

5.4. M, C, T reflexes of *? interrupting the vowel of the ultimate syllable.

5.4.1. I reconstruct PMx ultimate syllable of *CV?V pattern whenever there is unanimous witness in a set to *CV?V. Whenever, however, even one language of a set witnesses to *CV? rather than to *CV?V, I assume that the other language (or languages) has expanded to CV?V by rearticulating the vowel. Notice, e.g., set 172: M-SM ñų̄?ų̀ fire; C yą́?ą̀ the fire, ?yą́?ą̀ the sun; T $dą^{3}$?$ą^{3-4}$/ $yą^{3}$?$ą^{4-3}$ fire, light, $gu^{3}ni^{3}$?$yąhą^{4-3}$ daylight. In evaluating this set the witness of the last T form is crucial, in that, while it is perhaps conceivable that this T form should be some sort of a backformation from *?ya?am, it is more plausible to consider it as deriving from *?yam?. Furthermore there is enough sporadic expansion of *(?)CV? to (?)CV?V in M, C, T to justify the assumption that we here have an unusual instance of parallel expansion in the three languages. It is, or course, possible that this expansion

took place in late PMx. Nevertheless, in the face of such data as that given to us in the last T form of the above set. I do not feel that we can reconstruct PMx *CV?V for this set with any assurance. This of course raises the possibility that some of the sets for which I reconstruct *CV?V reflect such parallel M, C, T expansion rather than a PMx interrupted syllable. The comparative method can give us no criterion for discerning between such parallel developments in related languages and a common inherited feature. Nevertheless, it seems somewhat probable that, since expansion of a *CV? root by rearticulating the stem vowel is a rather sporadic phenomenon, the bulk of our sets with unbroken M, C, T witness to *CV?V reflect a PMx interrupted syllable. The same line of reasoning would be used to refute the suggestion that possibly all the sets with CV?V in any or all the languages are, after all, simply expansions of PMx *CV?. Here it could be argued that the existence of at least some PMx *CV?V syllables would be necessary to provide the model for the expansion of *CV? in the various languages. To summarize: it seems highly probable that interrupted *CV?V syllables occurred in PMx, and highly probable that sets with undissenting M, C, T witness to *CV?V hark back to syllables of such structure; nevertheless doubts may perhaps be entertained as to the provenience of the M, C, T forms of any given set in view of the M, C, T tendency to expand sporadically *CV?> CV?V.

Illustrative sets follow: (141) M-SM hā?à, M-SE hē?è, M-J ča?a; C kā?ā; T ži^{3}?i^{2} foot. (184) M-SM và?ā; T we^{3}?e^{2} good, fine. (241) M-SM kō?ō, hí?ī; C kú?ú, hí?í, čī?ì, ndí?í; T go^{3} ?o$^{3-4}$ to drink. (263) M-SM ?ų̄?ų̀; C hų̄?ū; T ?ų^{5}?ų^{5} five (T ko^{4}-?ų^{5}? twenty-five presumably contains an abbreviation of ?ų^{5}?ų^{5} but this shortened form could indicate PMx *CV? rather than *CV?V.).

5.4.2. There are some sets, similar to those just illustrated, where the T forms have CV?Vh structure. The T final -h witnesses to a second *? somewhere in the PMx form. The position of this second *? was either (a) final in *CV?V? syllables so that a vowel could be both interpreted and closed by *?; or (b) initial in *?CV?V syllables with metathesis of the initial *? to final position in T. There is something to be said in favor of either alternative. In favor of (a) note set 159 in which C witnesses to a final *? in what appears to be a PMx interrupted syllable: (159) M-SM ñų̄?ū; C yą́?ą̀?; T yo^{3}?o$^{1-2}$ land, soil. Notice, however, set 151 in which C initial *?- may be parallel to the T -h; this set points in the direction of alternative (b): (151) C dà-n?dé?ē to

chew, to dance; T rą^{2}?ą^{5}h to dance. It is well to remember, however, that while initial C ?- is sometimes suspect of being an addition, C final -? is probably not so suspect. We may therefore weigh the C witness in favor of (a) more heavily than the witness in favor of (b).

Nevertheless, somewhat in favor of (b) again is the following T development which is perhaps parallel: Some PMx *?CV? syllables apparently rearticulate the vowel in T with metathesis of the first PMx *? to final position in the newly created syllable. Notice set (193) M-SM ?ɪ?yà saint, god; T gi^{3}?yąhą$^{4-3}$ holy day, fiesta (< gwi^{3} day + ?yą$^{3-4}$? holy), yą^{3}?ąhą$^{4-3}$ god, saint (PT *?yą? > disyllabic *?yą?ą > *yą?ą?). (See also 192). Such a development as this may lead us to raise the question as to whether or not T might not have metathesized initial *? of PMx *?CV?V syllables to final position in the T disyllabic reflex—as per alternative (b) —if, in *?CV?V created from PMx *?CV?, such a metathesis also took place.

Without attempting to decide decisively between the above alternatives, I pass on to the next section. Enough data has been presented to show that T -h on forms harking back to PMx interrupted syllables, is not a T innovation but is a reflex of a second *? present somewhere in the PMx form. This second *? undoubtedly had a characteristic position even if we can not localize it with certainty. For further examples of sets involving PMx interrupted syllable with presence of second *? somewhere in the form see 133, 156, 177, and 252.

5.5. Sets ambiguous as to PMx final *-? vs. PMx *? in *?C ultimate syllable cluster.

5.5.1. The following sets are ambiguous as to PMx final *? vs. PMx *?C ultimate syllable cluster; the ambiguity is resultant on lack of a decisive C witness as to the position of *? in the PMx form: 13, 15, 25, 74, 108, 117, 128, 132, 152, 204, 205, 208, 210, 265, 269, 270. 273. Nevertheless, in reference to those of the above sets for which PMx tones have been reconstructed, it is possible to raise the question as to whether or not the reconstructed tone pattern is one which would characterize a PT form shifting *?C > CV?. If the answer to this question is negative, we then reconstruct final *? rather than ultimate *?C cluster. In examining the above seventeen sets—and for most of them it has been possible to reconstruct PMx tones—there is but one set (25) for which we need to posit final *? according to the above criterion: M-SM kānī to pound, to hit; T gu^{3}nī$^{3-5}$? to quarrel, to fight. Here, M mid-mid ~ T 35 indicates PMx tones *43. But, according to

statements (2) and (3) under 5.3.1.3. PMx *?n > T ?n (or, at least, simply > n) on forms with PMx *43. Therefore, set 25 does not point to a PMx form with *?n but to one with final *-?. Surprisingly enough, however, in every other set with reconstructed tones of those listed above as ambiguous as to position of PMx *?, the reconstructed tones are such that the PMx form could have contained a *?C ultimate syllable cluster.

5.6. Residues. I list here data from four sets in which the C witness to *? cannot be reconciled with absence of T ?/h/21 on any of the ground presented above: (185) C ?yáává; T ža^{3}wi$^{5-3}$ butterfly; (258) C yɰɰ?; T tɰ^{3} blood. (264) C (yą?ą́) ndūùtè? sand; T ču^{3-4-3}-powder. (277) C ?yūùdè; T žu^{3}tu$^{4-3}$ mouse.

Some of the above sets may simply be spurious. On the other hand, these sets may preserve evidence that in PMx there were a few roots for which variants existed—one variant with *? present in the form and one variant without it. That such a situation existed, at least in regard to *?w vs. *w seems quite possible from the following data: (44) M-SM tāù to owe, ^{a}dá?ú to be poor; T da^{3}?wi^{3} to owe. (Note the etymological doublet witnessing to *?w and *w in M-SM with only the former surviving in T.) (45) M-SM sāù rain; T sà?ū to submerge; C dāāvē thunder; T-Ch du^{3}?wi^{3} thunder, T-Co yuwi rain. (Note the etymological doublet in M, with only *w surviving in C—unless the *? of *?w was metathesized and lost, and with *?w in T-Ch but *w in T-Co.) Such data as the preceding probably point to the presence of some sort of *-?- derivative or inflectional infix in PMx.

NOTE

1. For similar arguments supporting a similar analysis in present day Trique, cf. FPPT p. 75, fn. 2 and Longacre, 'Rejoinder to Hamp's Componential Restatement of Syllable Structure in Trique,' IJAL 16 (April, 1955) p. 191, fn. 4.

6. PMx tones

6.0. The reconstruction of PMx tones is based on a comparison of four tone systems, those of M-SM, M-SE, C, and T-Ch. The reconstruction of the tones is not based, therefore, on so broad a base as are the reconstructions presented in the preceding sections, in that M-J, M-M and T-Co are nowhere taken into account.

6.1. Present-day tone systems.

6.1.1. The tone system of M-SM.

6.1.1.0. M-SM exhibits a system of three phonemic pitch levels. In this dialect, where couplets of structure (C)CVV, (C)CV?V, (C)CVC(C)V, and (C)CV?CV occur, one tone occurs to the syllable. The segmental disyllabic sequence is thus paired with a suprasegmental sequence which is termed the tone couplet by Pike and Mak. The tone couplet is basic to the description of the distribution of the tones in basic patterns and in sandhi variants. The following brief sketch of the M-SM tone system is a summary of certain portions of Pike's description of M-SM tone (TL, p. 77-81).

6.1.1.1. The following tone couplets occur as basic in M-SM: high-high sáná turkey; high-mid, ñĩ?ī steam bath; high-low, vá?ù coyote; mid-high, kūčí pig; mid-mid, vē?ē house; mid-low, kōð snake, kūtù nose; low-high, sùčí child; low-mid, mìnī puddle. There occur, therefore, all theoretically possible sequences of two tones in a three level system except the sequence low-low.

6.1.1.2. The last four of the tone couplets listed and illustrated above have tone sandhi variants as follows: Mid-mid ~high-mid, bē?ē ~ bé?ē house; mid-low ~ high-low, kōð ~ kóð snake (this sandhi variation only in (C)CV̄V̀ couplets with identical vowels and in (C)CV̄?(C)V̀ couplets); mid-low ~ mid-high, kūtù ~ kūtú nose (this sandhi variation in CV̄V̀ couplets with differing vowels and in (C)CVC(C)V couplets); low-high ~ high-high, sùčí ~ súčí child; low-mid ~ high-mid, mìnī ~ mínī puddle. Notice that all the above sandhi variants are characterized by a high tone in the first or second syllable of a couplet that has mid or low tone in that position in its basic pattern. However, (C)CV̄V̄ couplets with identical vowels vary either to (C)CV́V̄ or to (C)CV́V́—thus involving as one of the freely varying tone sandhi variants a unique sort

of variant in which both syllables of the couplet have high where the basic pattern has other than high on both these syllables.

6.1.1.3. The sandhi variants involving the high tone(s) occur as variants of tone couplets mid-mid, mid-low, low-high, or low-mid (i.e. the tone couplets characterized by such sandhi variation) whenever one of these couplets is preceded by tone couplet high-high, high-mid, mid-mid, mid-low, or low-high, provided (a) that the form bearing one of the latter couplets belongs to an arbitrary class the members of which condition sandhi variation; (b) that the high-high is not itself a sandhi variant but a basic pattern; and (c) that no pause intervenes between the couplets involved. Thus, in the following phrase ʔĭsò rabbit with basic mid-low couplet varies to ʔɪsó with mid-high couplet after kōò snake and kēē will eat—which are mid-low and mid-mid respectively and belong to the arbitrary class of couplets the members of which condition sandhi variation: hā-ⁿdátū kōò ʔĭsó that the snake might await the rabbit; kēē ʔĭsó the rabbit will eat. But in other contexts, ʔɪsò does not have this sandhi variation but occurs with the same tone couplet that is characteristic of it as an isolated form: yāù ʔɪsò the cave of the rabbit; kēē ʔɪsò the rabbit will go away. Notice that yāù cave has tone couplet mid-low but does not belong to the arbitrary class of forms conditioning sandhi variation. Similarly kēē will go away is homophonous with kēē will eat, but the former does not condition sandhi variation while the latter does. Data of the sort just cited emphasizes the arbitrary and mechanical nature of M tone sandhi variation.

6.1.1.4. One further type of tonal variation in M-SM may be analyzed synchronically as a morpheme of tone substitution (replacive high-high) with meaning adjective modifier. Notice, for example, the interesting contrasting phrases marshalled by Pike: nĭ-kānī tɻ̨́ʔɻ̄+ná́ complete-hit comrade-mine, i.e. (he) hit my comrade vs. nĭ-kānī tɻ̨́ʔɻ́-ná́ complete-hit together-I we, i.e. we traded blows. Also ñānĭ sùčí+ɻ́ the brother of that child vs. ñānĭ sú́čí+ɻ́ that younger brother. In the above phrases tɻ̨́ʔɻ̄ comrade + replacive high-high > tɻ̨́ʔɻ́ together, and sùčí child + replacive high-high > sú́čí child-like.

6.1.1.5. The above sketch presents in broad outline the tone system of M-SM along with the tone sandhi that is characteristic of that dialect. It does not attempt to present exhaustively the latter but omits many details—especially the tone sandhi involving abbreviated couplets acting as pronominal enclitics, and the striking parallelism of tone variation in verb aspects to tone sandhi variation. I note in passing that Pike analyzes tone

variation in the verb aspects as tone-sandhi variation conditioned by a preceding zero form. (TL, 82).

6.1.2. The tone system of M-SE.

6.1.2.1. M-SE exhibits a system of four phonemic pitch levels numbered 1, 2, 3, 4 from high to low (Mak, CTMTS). The basic tone couplets of M-SE are 11, 21, 41, 12, 22, 42, 13, 42/43, 14, 24. Thus, of the sixteen theoretically possible sequences of tones in a four-level system, only ten occur—but two more than the number of basic tone couplets occurring in M-SM with its simpler three-level system. Note again that there is no basic 44 tone couplet, just as there is no basic low-low tone couplet in M-SM. Finally, it is important to observe that tone 3 occurs in basic tone couplets only in 13 and in 42/43. The former class, in which alone 3 occurs as basic without varying freely to 2, is so restricted that Mak records only nine items displaying this basic tone pattern. None of these nine items enter into our cognate sets, where the occurrence of M-SE tone 3 is so rare that I am able to transcribe M-SE tone 1 as high (ˊ), tone 2 as mid (¯), and tone 4 as low (ˋ) in order to better compare the tones of M-SM and M-SE forms.

6.1.2.2. The tone sandhi variation characteristic of M-SE is much too involved to present in any detail here. However, Mak summarizes the following significant ways in which M-SE tone-sandhi differs from that occurring in M-SM: (1) Sandhi variation to lower tone patterns (e.g. 11 ~ 31, 21 ~ 31, 22 ~ 32/33, 24 ~ 34) is more extensive than variation to high—which occurs only after certain forms with final tone 1 (e.g. 24 varies to 14 after a class of forms bearing 11). (2) Some M-SE tone sandhi variants are complex tone couplets with one or both members of the couplet consisting of a sequence of two tones on a vowel no longer than one bearing but one tone in M-SM: e.g. 41 ~ 1 3-1, 42 ~ 1 3-2 and 41 ~ 2-1 3-1 (the latter is a sort of sandhi variant occurring only in certain restricted syntactic situations; see next statement). (3) Some tone couplets have special sandhi variants in restricted syntactic situations (termed 'special syntactic sequences' by Mak). The special sandhi variants occur most frequently after an arbitrary class of forms bearing tone couplets 22 and 24; the following tone couplet is varied to a higher tone pattern, but the sandhi variant with the higher tone pattern is formally distinct from the sort of sandhi variant to high subsumed under statement (1). (4) Tone couplets with tone 1 as first member condition sandhi variation in <u>preceding</u> couplets as follows: certain forms with tone 1 as the second member of their tone couplet vary that tone 1 to tone 2;

while, conversely, certain other forms with tone 2 as the second member of their tone couplet vary that tone 2 to tone 1.

6.1.2.3. To illustrate the varieties of tone sandhi listed above, I reproduce here Mak's series of illustratory data involving ^{n}dĭ^{2} vĭ^{4} egg. In the phrase ʔɨ^{2}ɨ^{2} ^{n}dĭ^{2}vĭ^{4} one egg, this form occurs with a 24 couplet which is taken as descriptively basic. In the phrase ta^{4}ka^{2} ^{n}dĭ^{1}vĭ^{4} each egg there occurs a tone sandhi variant 14 conditioned by a preceding form with basic tone couplet 41. The occurrence of sandhi variant ^{n}dĭ^{1}vĭ^{4} rather than of the basic form ^{n}dĭ^{2}vĭ^{4} illustrates sandhi variation to higher tones as mentioned in statement (1). In turn, the occurrence of sandhi variant ta^{4}ka^{2} rather than of the basic form ta^{4}kă^{1} illustrates statement (4). In the phrase ʔɨ^{2n}ga^{2} ^{n}dĭ^{3}vĭ^{4} another egg, variation of ^{n}dĭ^{2} vĭ^{4} to tone couplet 34 illustrates sandhi variation to lower tones as mentioned in statement (1). The phrase nu^{2}u^{4} ^{n}dĭ^{3}vĭ^{1} to the egg (e.g. in such phrases as add some chile to the egg) illustrates the special sandhi variation mentioned in (3). I add another of Mak's illustrations, one involving nɨ^{4}ʔɨ^{2} strong, to illustrate statement (2); the following phrase also involves special sandhi variation of the sort just illustrated: ta^{2}čĭ^{4} nɨ$^{2-1}$ʔɨ$^{3-2}$ strong wind.

6.1.2.4. There is some M-SE tone variation to higher tone patterns on lines somewhat parallel to that involving the replacive high-high adjective modifier morpheme in M-SM. But Mak interprets this variation—which is neither consistently a variation to any one given tone pattern nor a phenomenon as widespread as in M-SM—as simply a type of special sandhi variation in restricted syntactic sequences. Thus, while yu^{2}ku^{2} ^{n}dĭ^{1}vĭ^{1} egg mountain (i.e. 'where we go to get eggs') involves a variation of ^{n}dĭ^{2}vĭ^{4} egg to tone couplet 11 in a fashion reminescent of M-SM, the variation of la^{2}^{n}ɣi^{2} sheep to 2-1 2 in the phrase yu^{2}ku^{2} la$^{2-1}$^{n}ɣi^{2} is not formally so parallel to the M-SM replacive high-high adjective modifier morpheme.

6.1.2.5. Of some relevance to the diachronic evaluation of the M-SE system of four phonemic pitch levels is the following observation by Pike: "The gap between 1 and 2 [in the M-SE tone system] is relatively very large; that between the lower tones is relatively very slight." (NACTT, 101). There will be occasion to comment on this phonetic datum later (6.2.1.).

6.1.3. The tone system of C.

6.1.3.0. C has three phonemic pitch levels. There has been published no complete distributional statement relative to C tones nor an analysis of C tone sandhi (cf. brief sketch in CMM, p. 50).

The following statements are based, therefore, on my own examination of the C word lists prepared for me by Davis and Walker. I examine first isolated nouns in the lists, and state the tone patterns found on such items. Secondly, I list certain tone patterns never found in isolated nouns in these materials but only in noun phrases occurring there. Finally, I attempt to correlate with the above similar data in the verbs of the data available to me.

6.1.3.1. For the isolated nouns in the C word-lists I take account of items with the following canonical shapes (C symbolizes consonant or permitted cluster in the following formulae; any canonical form is to be understood as occurring with or without final -?: CVVCV, CVV, CV?V, CV?VV, CVCVV, CVVCVV, and CVVV/ CVV?. The following tone patterns occur with forms bearing the canonical shapes just listed: (a) general pattern high-high, in C$\acute{V}\acute{V}$CV, C$\acute{V}\acute{V}$, and C$\acute{V}$?$\acute{V}$. (b) general pattern high-low, in C$\acute{V}\grave{V}$CV, C$\acute{V}\grave{V}$, C$\acute{V}$?$\grave{V}$, and C$\acute{V}\grave{V}$C$\grave{V}\grave{V}$. (c) general pattern mid-mid, in C$\bar{V}\bar{V}$C$\bar{V}$, C$\bar{V}\bar{V}$, C$\bar{V}$?$\bar{V}$, C$\bar{V}$?$\bar{V}\bar{V}$, and C$\bar{V}\bar{V}$C$\bar{V}\bar{V}$. (d) general pattern mid-low in C$\bar{V}\grave{V}$C$\grave{V}$, C$\bar{V}\bar{V}$C$\grave{V}$, C$\bar{V}\grave{V}$, C$\bar{V}$?$\grave{V}$, C$\bar{V}$?$\grave{V}\grave{V}$, C$\bar{V}$C$\bar{V}\grave{V}$, and C$\bar{V}\bar{V}$C$\grave{V}\grave{V}$. (e) general pattern high-mid-low (statistically rare) in C$\acute{V}\bar{V}$C$\grave{V}$, C$\acute{V}$C$\bar{V}\grave{V}$, and C$\acute{V}\bar{V}$C$\grave{V}\grave{V}$. (f) The following statistically rare miscellaneous patterns also occur on the following canonical forms: C$\bar{V}\acute{V}$C$\grave{V}$, C$\acute{V}\bar{V}$, C$\grave{V}$?$\bar{V}\bar{V}$, C$\bar{V}$C$\acute{V}\acute{V}$, C$\bar{V}\bar{V}$C$\acute{V}$ (the latter occurs in but one isolated noun in my list of 800 items; it occurs most typically as a sandhi variant of other patterns in phrases). (g) Canonical form CVVV/CVV? occurs with the following tone patterns on isolated forms: C$\acute{V}\bar{V}\acute{V}$/C$\acute{V}\bar{V}$? and C$\bar{V}\grave{V}\bar{V}$/ C$\bar{V}\grave{V}$?. This rather rare canonical form overlaps with the statistically rare C$\acute{V}\bar{V}$ form listed under (f) in that the two such latter forms in our lists are both C$\acute{V}\bar{V}$?, and appear therefore to be like CVVV/CVV? forms except for the lack of the first variant.

6.1.3.2. The following tone patterns are found only on C nouns in phrases in our lists; they are, presumably tone sandhi variants of isolated forms: (1) general pattern mid-high in C$\bar{V}\acute{V}$ and C$\bar{V}$?$\acute{V}$ (along with C$\bar{V}\bar{V}$C$\acute{V}$ which occurs several times on nouns in phrases in our lists, but only once on an isolated noun). (2) mid-low-mid in C$\bar{V}\grave{V}$C$\bar{V}$. (3) general pattern high-mid in C$\acute{V}\acute{V}$C$\bar{V}$.

6.1.3.3. In relating these tone patterns which are restricted to sandhi variants to the tone patterns of nouns in isolation, I note briefly that (a) mid-high occurs as tone sandhi variant of forms that are mid-mid or mid-low in isolated CVVCV or CVV forms and high-high or high-low in isolated CV?V forms: ndūūtë egg, fruit (266) vs. ndūūté kʦ?yǫ? thorn-apple and ndūūté ?nę̄ę̀

black-berries (but without this sandhi variation in ndūūtē ʔvíʔī pear, and ndūūtē háʔéī nuts). yāàtà leaf, plant, vs. yāātá hīìvà herb (but without the sandhi variation in yāàtà mʔbáá milky juice exuding from certain herbs; and with a further mid-mid variant in the phrase yāātā kwāā 'cow's-tongue,' name of an herb). kūù bell, iron, metal (124), vs. kūú kāì sword (but without this sandhi variation in the phrase kuù kwᵑᵐyō lance, and with a further mid-mid variant in the phrase kūū tᶴᶴ ax). yᵩʔᵩ́ a stick (110) but yᵩʔᵩ́ ndīìnòʔ a digging-stick. yᵩ́ʔᵩ̀ʔ earth, soil (159) but yᵩʔᵩ́ ndūùtèʔ sand (but without this sandhi variation in the phrase yᵩ́ʔᵩ̀ ndīìyā the coast). (b) Mid-low-mid occurs as tone sandhi variant of forms bearing mid-low in isolation: ndūùkǔ chiremoya (a tropical fruit) (239), but ndūùkū mᵩ̄ʔᵩ̀ anona (another tropical fruit). Note also the tonal variation in the first form in the following phrases: tīìnò mᵩᵩ underwear, but tīìnō yūùdò blanket (222). (c) high-mid occurs as tone sandhi variant of forms bearing high-low or mid-low in isolation: nʔdáátòʔ tomato but nʔdáátū vààkū pod-tomatoes. ʔɪʔyò rope (231) but ʔíʔyō kūù chain. yūùkùʔ summer squash (76), but yúúkū yūùnùʔ and yúúkū ndūùkú names of two species of squash (but also other variants in the following phrases: yūūkù yᵩ̀ᵩ̀ and yúúkù háʔáí names of two other species of squash).

6.1.3.4. Besides the above sandhi variants, which (except for CV̄V̄CV́) are not found in isolated nouns in my C word-lists, there are the following sandhi variants involving tone patterns occurring also in isolated forms: (1) high-high varying to mid-mid: nᶴᵑǫ́ corn (37) but nɪᶴᵑǭ ndúúčà hominy eaten as a vegetable. (2) mid-mid varying to high-high: nʔdāākā orchids, but nʔdáákáá nᶴᵑnè name of a species of large orchids. (3) mid-mid varying to mid-low: ndūūkū twig, switch, but ndūūkù dᶴᵑyū little twig.

6.1.3.5. The potential aspect has aptly been taken by Davis and Walker as the form of the C verb that is descriptively basic. Tone patterns of the potential aspect of various verbs fit with some modification into the scheme outlined above for the tones of isolated forms of nouns; but the correlation is somewhat difficult in that 'isolated' forms of verbs do not occur—in view of the circumstance that verbs are accompanied regularly by a following subject expression which is often an enclitic pronoun, and enter very typically into phrase formation (stress-group) with preceding particles and (often abbreviated) auxiliary verbs. In an attempt to correlate the basic tone patterns of verbs with the tone patterns occurring in isolated nouns, I select for comparison with nouns the potentials of verbs that occur in that aspect without a preceding particle or auxiliary verb. The following four tone patterns,

occurring in the potentials of such verbs, occur also in the isolated forms of nouns: (a) high-high in CV́V́CV́, CV́V́, CV́?V́ and CV́?V́V́; (b) high-low in CV́V̀CV̀ and CV́V̀; (c) mid-mid in CV̄V̄CV̄, CV̄V̄, and CV̄?V̄; (d) mid-low in CV̄V̀CV̀, CV̄V̄CV̀, CV̄V̀, CV̄?V̀, CV̄?V̀V̀ and CV̄V̄?V̀V̀. There also occur in potentials of such verbs the following tone patterns, which occur only in non-isolated nouns in my word-lists: CV̄V̄CV́ (which occurs, however, in one isolated noun) nąą̄?mį́ to present; CV̄V̀CV̄ kūùtū to be filled; CV́V́CV̄ ?kąą́yū̄ to laugh; and CV́V̄CV̄ n?dáātī to loosen (the latter not listed above as sandhi variant of noun but is grouped here with CV́V́CV̄ as a further variation of general high-mid pattern). Other tone patterns occur in the potentials of verbs with preceding particles or auxiliary verbs in that aspect, e.g. low-mid in CV̀V̀CV̄ nā-dà-kùùkū to adorn (271) and low-low in CV̀V̀CV̀ kā-ndī?và to frighten (62).

6.1.3.6. Of the four aspects of the C verb the prior past most often has a tone divergent from that characterizing the other aspects. Thus, many verbs have high-high or mid-high in that aspect regardless of the tones of the other aspects (sets 43, 63, 126, 134, 271). Of the other three aspects, it may be noted that (a) some verbs have a common tone pattern in the potential, present, and past—and in the prior past as well for some of these verbs, (sets 3, 8, 21, 43, 119); (b) other verbs have one tone pattern in the potential and present vs. another tone pattern in the past, (sets 28, 59, 91, 101, 102, 103); (c) other verbs have one tone pattern in the potential vs. another tone pattern in the present and past, (sets 62, 84, 90, 133, 146); (d) other verbs have one tone pattern in the potential and past vs. another tone pattern in the present (34, second C verb in 62, second C verb in 63, second C verb in 116); and (e) a few verbs have separate tone patterns for these three aspects (set 113). In reference to the C verbs included in our array of cognates, there is decreasing statistical frequency from (a) to (e).

6.1.3.7. In reference to the same limited sample of C verbs, viz, those that occur in our array of cognates, it is interesting to note the formally contrasting tone patterns in (b), (c), and (d)—each of which involves one tone pattern common to two aspects vs. another tone pattern found in the other (not the prior past) aspect. The formally contrasting tone patterns are: (1) high-high vs. mid-low, i.e. CV́V́CV́ vs. CV̄V̀CV̀, CV́?V́ vs. CV̄?V̀, and CV́V́ vs. CV̄V̀ (sets 59, 60, 91, 116, 123, 241, 220); (2) high-high vs. low-low, i.e. CV́V́CV́ vs. CV̀V̀CV̀ (very rare, set 28); (3) high-low vs. mid-low, i.e. CV́V̀CV̀ vs. CV̄V̀ (set 154); (4) mid-mid vs. mid-low,

i.e. CV̄V̄CV̄ vs. CV̄V̀CV̀, CV̄V̄ vs. CV̄V̀, and CV̄ʔV̄ vs. CV̄ʔV̀ (sets 10, 11, 36, 48, 54, 63, 90, 133, 134); (5) mid-mid vs. low-low, i.e. CV̄V̄ vs. CV̀V̀ (set 145); and (6) mid-low vs. low-low, i.e. CV̄V̀CV̀ vs. CV̀V̀CV̀ and CV̄V̄CV̀ vs. CV̀V̀CV̀ (sets 62, 116). In these intra-paradigmatic contrasts, (1), (3), (4), and (6) involve mid-low vs. some other tone pattern common to two aspects; in almost all these contrasts involving mid-low (except, in fact, for two cases involving the tone of the potential vs. the tones of the present-past), the mid-low tone pattern occurs in the past—whether that tone pattern be restricted to the past vs. potential-present, or whether it be common to present-past vs. potential or to potential-past vs. present. The occurrence of low-low in (2) and (5) above affords some contrast of C verb structure with noun structure in that low-low does not occur in the nouns of my word-lists, whether isolated or in phrases.

The above observations by no means constitute either a complete distributional statement of C tones nor an analysis of the C tone sandhi system. Nevertheless, they suffice, I trust, to outline for us the characteristic tone sequences of C along with the typical range and type of tonal variation both in C tone sandhi and within the C verb paradigm.

6.1.4. The tone system of T.

6.1.4.1. T-Ch is characterized by a system of five phonemic pitch levels (Longacre FPPT). Nevertheless, only a few of the theoretically possible sequences of tones occur either in successive syllables or in the same syllable. On disyllabic words with one tone to each syllable the following sequences occur: 23, 25, 32, 33, 34, 35, 42, 43, 44, 53, 45, 55 (of the preceding 45 is extremely rare). The following monosyllabic sequences of tone occur in T ultimate syllables—the only position in the word where such monosyllabic sequences or 'glides' occur: 1-2, 2-1, 1-3 (only one such example), 2-3, 3-2 (only one such example), 3-4, 3-5, 4-5, 4-3, 5-1 (only one such example), 5-2 (only one such example), 5-3, 5-4, 3-4-3, 3-5-4. Notice, that of these fifteen monosyllabic sequences there are four of unique occurrence in my present data. Furthermore, of the eleven remaining monosyllabic sequences, 1-2, 4-3, 5-3, 5-4, 3-4-3 and 3-5-4 were shown in section 5.1. to be phrase-final variants of 2-1, 4, 5, 3-4 and 3-5—variants historically consequent on fusion of some enclitic -V^3 particle marking the end of the noun phrase. For historical purposes, then, I consider pertinent neither these six monosyllabic sequences of recent origin in T nor the four monosyllabic sequences of unique occurrence (since the forms in which

the latter occur do not appear to have cognates in M or C). Only the following five monosyllabic tone sequences are of historical pertinence: 2-1, 2-3, 3-4, 3-5, and 4-5. Furthermore, as also shown in 5.1.3., the 2-1 monosyllabic sequence is a development in T itself consequent on loss of PT *-ʔ. Ultimately, therefore, only the latter four of these five monosyllabic tone sequences are of interest in comparing M, C, T tone systems.

6.1.4.2. As stated in 5.1.2., I consider that T monosyllabic 3h (3) forms and disyllabic 3 4h(3) forms are developments of T roots with tones 3-4h, while T monosyllabic 3ʔ(3) and disyllabic 3 4ʔ(3) I consider to be developments of T roots with 3-5ʔ. Therefore, in marshalling the sets of tone correspondences in 6.3.3., I regard T 3h(3), 3 4h(3), and 3-4h as historically equivalent, and T 3ʔ(3), 3 4ʔ(3) and 3-5ʔ as likewise equivalent.

6.1.4.3. There is a morphotonemic relationship between monosyllabic and disyllabic tone sequences involving tones 23 or 34: e.g. $ru^{2}ne^{3}$ avocado (unpossessed) but zi^{3}-$ru^{3}ne^{2-3}$ avocado (possessed); $ra^{3}zǫ^{4(-3)}$ things (unpossessed) but $ra^{3}zǫ^{3-4}$ things (possessed). Also words with disyllabic 35 sequence such as $da^{3}ʔmą^{5(-3)}$ leg act, in respect to distribution with T fused enclitics, very much like words with monosyllabic 35 sequence, e.g. $du^{3}gų^{3-5}$ to shine, and $ma^{4}ru^{3-5(-4)}$ black. Therefore, for comparative purposes, I consider disyllabic and monosyllabic sequences of tones 23, 34, and 35 to be equivalent. Finally, there is a class of verbs in 2h some members of which vary freely or idiolectally to 2 5h, e.g. $gu^{3}du^{3}ʔwe^{2}h/gu^{3}du^{2}ʔwe^{5}h$ to sell, $gi^{3}ži^{3}ʔyą^{2}h/gi^{3}ži^{2}ʔyą^{5}h$ to bark (of a dog). I assume that the forms with tone 2 on the penultimate syllable are historically the more basic, and that the variants with 2h (and many 2h forms no longer varying with 2 5h) came about by a shifting of the tone 2 (PT and PMx *1) to the ultimate syllable in a development parallelling that of the 23 > 3 2-3 and 3 4 to 3 3-4. T exhibits, then, a certain tendency to shift contrastive tone towards the end of the word.

6.2. The tone system of PM (comparison of M-SM and M-SE tone systems).

6.2.1. The M-SE tone system of four phonemic levels is, as mentioned in 6.1.2., peculiar in two ways; (a) Tone 3—the next to the lowest tone—is almost entirely restricted to tone sandhi variants (6.1.2.1.); and (b) there is a disproportionate gap between tones 1 and 2, which are separated by a relatively wide interval, and tones 2, 3, and 4, which are separated by relatively narrow intervals (6.1.2.5.). These considerations make it very

plausible that tone 3 in M-SE is a development in the tone sandhi of that dialect whereby an allotone of one of the contiguous tones became phonemic. The precise details of this development are obscure and should someday be investigated. Nevertheless, the conclusion that the four-level tone system of M-SE is a historical development from an earlier three-level system seems inescapable. This is further supported by the fact that unpublished tone analyses in three other M dialects (M-J, M-M, and M of Santo Tomás Ocotepec) seem to indicate three-level systems there as well. I posit, therefore, a three-level system for PM. M-SE stands, then, at the end of an interesting course of historical development: (1) The four-level system of P̊Mx (see 6.3.) was reduced to three levels in PM. (2) The three-level system of PM was expanded again to a four-level system in M-SE. There are, however, significant differences between the old PMx four-level system and the modern M-SE four-level system; to mention one of the most outstanding of these differences, PMx employed tones 2, 3, and 4 in basic patterns and tone 1 perhaps exclusively in tone patterns that were sandhi variants, while M-SE employs tones 1, 2, and 4 in basic patterns and tone 3 almost—but not exclusively—in sandhi variants.

6.2.2. In comparing the basic tone patterns of M-SM with M-SE, the following generalizations may be made: (1) M-SM high tone corresponds to M-SE tone 1; while (2) M-SM mid tone corresponds to M-SE tone 2; and (3) M-SM low tone corresponds to M-SE tone 4. It is out of a desire to bring into relief these correspondences that in the array of cognates, I transcribe M-SE tones 1, 2, and 4 with the same diacritical marks used to mark M-SM high, mid and low respectively. Aside from tonal differences occasioned between these two dialects by the sporadic presence of high tone in one dialect where it is not found in the other—a phenomenon basically stemming from tone sandhi variants in PMx itself—the only statistically prominent exception to the above M-SM, M-SE tone correspondences is as follows: while M-SM tone pattern mid-low corresponds in some sets to M-SE 24, there are other sets in which M-SM mid-low corresponds to M-SE 22. Thus, while M-SM kō?ò corresponds to M-SE $ko^{2}?o^{4}$ bowl (242), and M-SM sāù corresponds to M-SE $sa^{2}u^{4}$ rain (45), it is also true that M-SM ?ɪnà corresponds to M-SE $?i^{2}na^{2}$ dog (165), and M-SM kūù corresponds to M-SE $ku^{2}u^{2}$ to die (43). However, internal reconstruction in M-SE affords some evidence that at least some of the present 22 couplets corresponding to M-SM mid-low couplets were once 24—or at least mid-low before the further tone level developed in

M-SE; e.g. M-SE ku^2u^2 to die has a special 2-1 4 sandhi variant in a few restricted phrases such as ma^2a^4-$ku^{2-1}u^{4+de^3}$ he won't die. Furthermore, many 22 couplets in M-SE belong to a class that condition sandhi variation to lower in certain following couplets; e.g. 22 + 21 > 22 31. Finally, in some idiolects, these 22 couplets vary to 22-4. From a detailed study of such data as these, Mak, prior to my own research and independently of me, stated the hypothesis that couplets such as the 22 couplets just illustrated 'are those which historically perhaps ended on a tone 4, whatever their present form, and that this low-toneme now usually transfers itself to the following morpheme' (CTMTS, 92, fn. 11). Mak adds that many 22 couplets which belong to the class that condition sandhi variation to lower correspond to mid-low couplets in M-SM. This hypothesis of Mak's would account not only for the M-SE 22 couplets corresponding to M-SM mid-low, but would also account for the fact that M-SE, in opposition to M-SM, is characterized by a great deal of sandhi variation to lower tone patterns—inasmuch as the latter came about according to Mak's hypothesis by transfer of low tone from preceding couplet to following couplet. I assume, therefore, that M-SM mid-low corresponding to M-SE 22 or 24 reconstructs as PM mid-low.

6.3. The tone system of PMx.

6.3.1. The argument for four reconstructed register tones. Four phonemic pitch levels are reconstructed for PMx. The argument for four reconstructed levels is as follows: (1) There appear to be fourteen tone correspondences indicating fourteen contrasting tone patterns in PMx. Eight of these patterns reconstruct with considerable regularity and appear to have been basic in PMx forms (see 6.3.2., 6.3.4.); the other six tone patterns are reconstructed from the sporadic appearance of high tones in the M, C, or T cognates of the sets, and appear to have occurred exclusively in sandhi variants (see 6.3.4.) (2) PMx forms, whether monosyllabic or disyllabic, seem to reconstruct with no more than two tones on a given form. This may be maintained with some assurance inasmuch as: (a) This seems to have been the situation in PM (inasmuch as complex tone couplets of the sort found in M-SE seem to be recent dialectal developments (cf. 6.1.2.2.). (b) Similarly, C tone may be subsumed under general tone patterns involving two tones to a form, while tone sequences involving three differing tones on the same form (e.g. high-mid-low) seem to be developments in C itself. (c) PT had one or at the most two tones to a form; present-day T, aside from complexities of recent origin (e.g. 3-5-4, and 3-4-3), has one or at the most two

tones on the last syllable of words—which is the characteristic position of occurrence for contrastive pitch. (3) It appears, therefore, that the fourteen contrasting tone patterns reconstructed for PMx were composed of one or at the most two tones to each pattern. Monosyllabic forms bore one tone or a sequence of two differing tones. Disyllabic forms bore a sequence of two tones whether identical or non-identical. Disyllabic forms appear to have been statistically more frequent than monosyllabic forms. (4) The question may now be formulated: how many tone levels need to be posited to accommodate fourteen differing tone patterns each consisting of a sequence of two tones whether identical or non-identical? (5) Inasmuch as the number of theoretically possible sequences of two identical or non-identical tones in a register-tone system is the square of the number of phonemic levels, it is immediately evident that neither two nor three tones will be sufficient to accommodate our fourteen tone patterns. On the other hand, a four-level system, with sixteen theoretically possible sequences of two tones, is adequate enough. (6) I posit, therefore, a four-level system. All theoretically possible sequences of two tones occurred except two.

6.3.2. The process of reconstructing the basic PMx tone patterns.

6.3.2.1. The eight tone patterns that appear to have been basic in PMx forms do not seem to have included the highest level of the PMx four-level system. Sets of tone correspondences involving M and C mid and low tones along with T tones 3, 4, and 5 (and T 2h in one set) reconstruct with considerable regularity. On the other hand the occurrence of M and C high tones, and of T tones 2-1 and 2 ($<$ PT *1) is a rather random and unpredictable phenomenon (see 6.3.4.). The reconstruction of our eight basic patterns becomes, then, essentially a matter of equating the sets of tone correspondences with eight of the nine theoretically possible sequences of the three lower tones.

6.3.2.2. To begin with, we may state with some confidence that the non-occurring but theoretically possible tone sequence involving the lower tones was *44. This conclusion is drawn from the following considerations: (1) Low-low does not occur in M-SM, nor 44 in M-SE; presumably PM did not have a *low-low tone pattern. (2) C low-low appears to be a development in that language itself. (3) T 55 is also a post-PMx development coming about in T as a grammatical device for marking potential in the verbs, and attributive status in adjectives and numerals.

6.3.2.3. In reconstructing our eight basic tone patterns of PMx we must, therefore, equate our eight sets of correspondences with

the following eight PMx sequences involving tones *2, *3, and *4: *(2)2, *(3)3, *23, *32, *34, *43, *24, and *42. Here we can only be guided by considerations of phonetic plausibility and probable parallelism of development in similar sets of tone correspondences. To begin with, in the eight sets of tone correspondences there are but the following reflexes in the particular languages: M mid-mid, mid-low, and low-mid; C mid-mid and mid-low; T (3)3, 34, 45, and 35. However, in that the latter language, T, reflects a recent development of a five-level system from an earlier four-level system by split of old high tone into two phonemic pitch levels, I immediately posit PT *(2)2, *23, *34, and *24 as historically basic in T to the above patterns (by eliminating the top level of the present five-tone system and re-numbering the four remaining levels from high to low). It is reasonable to assume that PT—which alone preserved the four-levels of PMx—might afford a better clue to the reconstruction of PMx tone patterns than either M or C both of which have reduced the old four-level system to three levels. Comparing, then, the M tone patterns with the T tone patterns, we note that M mid-low corresponds both the PT *23 and *24, while M low-mid also corresponds to both of these PT tone sequences. It seems plausible that M mid-low vs. low-mid witnesses to PMx falling tone sequence vs. PMx rising tone sequence, while T has merged into falling tone sequences both sorts of PMx tone sequences. T is suspect of having done this in that all PT tone sequences (*23, and *24, and *34) are falling sequences. Therefore, from M mid-low ~ PT *23, I reconstruct PMx *23, but from M low-mid ~ PT *23, I reconstruct PMx *32. Similarly, from M mid-low ~ PT *24 I reconstruct PMx *24, but from M low-mid ~ PT *24 I reconstruct PMx *42. There are two further sets of correspondences in which M mid-mid corresponds to T *34 and *24 respectively. From these two sets of correspondences I reconstruct the only other possible sequences of two dissimilar PMx tones, viz., *34 and *43. These reconstructions imply that M has merged these two PMx tone sequences into M mid-mid—thus eliminating at this spot one PMx tone level, while PT converts the distinction between the PMx falling and the PMx rising tone sequence into a T distinction between two falling sequences. Finally, M mid-mid corresponding to PT *(2)2 is considered to reflect PMx *(2)2, while M mid-low corresponding to PT *(2)2 is considered to reflect PMx *(3)3.

6.3.2.4. In all the above C has not been taken into account. Indeed, with but two contrasting tone patterns as C reflexes of eight original PMx tone patterns, C can be of little direct help—although

the C reflexes can be fitted into the above frameword worked out in reference to M and T. It may be stated, then, that C general pattern mid-low (mid-low low in CVVCV forms) is a reflex of PMx *34 and *43, while C mid-mid represents a merger of PMx *23, *32, *24, *42, *22, and *33.

6.3.2.5. The C reflexes do not seem to be, however, on first inspection as uniform as the above statement might indicate. Interference with the regularity of the C reflexes results from three factors: (a) present day C tone sandhi, (b) earlier C tone sandhi, here roughly labeled 'PC sandhi'; and (c) PMx sandhi variation to higher tone patterns. The third factor is common to M, C, and T; nevertheless it is especially troublesome in C in that it is necessary to distinguish this third factor from the other two, if we are to account for the apparent aberrancy of the tone reflexes in C.

6.3.2.6. We may consider the following tonal variations to be present day C tone sandhi (6.1.3.) or sandhi of a very recent period: (a) mid-high as variant of mid-mid or mid-low in CVVCV or CVV forms; (b) mid-high as variant of high-high or high-low in CV?V forms; (c) mid-low-mid as sandhi variant of mid-low; (d) high-mid as sandhi variant of high-low and mid-low; (e) high-high as sandhi variant of mid-mid, and mid-mid as sandhi variant of high-high. Therefore, whenever we encounter tonal variation in the same C form in a given set, we will ignore those variations if they conform to the above scheme.

6.3.2.7. There are in the C cognates of our sets sporadic occurrences of general pattern mid-mid where we would expect mid-low, and of mid-low where we would expect mid-mid. To account for these divergencies I posit an earlier sort of C sandhi (here roughly termed PC) in which these two tone patterns were in frequent alternation; after this alternation ceased to be a living part of C grammar some forms once having this alternation survived with one alternate and some such forms with the other. There are also sporadic occurrences of C low-low mid (in C$\grave{V}\grave{V}$C$\bar{V}$) and of low-low (in C$\grave{V}\grave{V}$) which occur after preposed particles in the potentials of verbs. These I likewise attribute to PC sandhi along with other tone patterns occurring in 'frozen' phrases (coalesced stress-groups). Here probably fits also the frequent occurrence of general pattern mid-low in the past of C verbs and of high-high in the prior-past, but the tones of the verb paradigms have probably been subject to a variety of analogical influences.

6.3.2.8. Finally there occur in the C cognates of our sets isolated forms with basic high-high and high-low. These tonal variations neither represent present-day C tone sandhi (in that they are

basic to isolated forms and not simply tonally variant forms restricted to phrases) nor PC sandhi, for they correlate in a systematic way with the sporadic occurrence of high tone in M and of tones 2-1 and 2 in T (i.e. PT *1). The C high-high and high-low forms are crucial to the reconstruction of the six tone patterns restricted to sandhi variants. In the sets of cognates cited below to illustrate the eight basic tone patterns reconstructed for PMx there occur a sizeable number of sets in which the C forms have tones that are reflexes of one of the PMx tone patterns occurring as sandhi variants. The conclusion should not be drawn that reflexes of PMx sandhi variants occur with special frequency in C as opposed to M and T; I have simply selected sets in which the crucial M and T tonal reflexes of the eight basic patterns are unobscured by PMx sandhi variation, but have not exercised the same care in excluding sets in which the tones of the C cognates bear witness to such variation.

6.3.3. Basic PMx tone patterns.

6.3.3.1. PMx *(2)2 > M mid-mid, C mid-mid, and T *(3)3 (< PT *(2)2. (7) M-SM, SE kāšį̄ to nurse; C dą̄į̄ a drop; T di^3ci^3 breast, $(g)u^3ci^3$ to nurse. (48) M-SM, SE kūū to exist, to be able; C kūūvē, hīī, čīǐ, ndíǐ to complete, nā-ndūūvī (ʔvīīkū) to bless animals, ndūūvē (ʔvīīkū) to bless; T $(ga^3)w\cdot i^3$ to be, to become, $(ga^3)na^3wi^3$ to heal, $na^3wi^3(nu^2)$ to be blessed, (ga^3) na^3wi^3 to be finished, to come to an end. (79) M-SM, SE ʔīkū; C ʔīǐkò (PC sandhi); T $gu^3kī^3$ yesterday. (113) M-SM, SE sākā to divide up, to distribute; C kà-ʔkāākā to divide up, ʔkāākā to cut (firewood); T $(g)a^3ka^3$ to shave, na^3ka^3 to sharpen, $(n\cdot e^{3-5})$ ka^3 scissors. (236) M-SM, SE yūʔū mouth; C dūūvī mouthful; T $du^3ʔwa^3$ mouth.

PMx *(2)2ʔ > M mid-mid, C mid-mid with retention of *-ʔ and mid-low (mid-mid low in ÇV̄V̄CV̀) with loss of final *-ʔ; and T 2h (< PT *2ʔ). In that T has recently lowered most noun forms previously 2h to 3h, the former survives only in a few nouns. (167) M-SM, SE ñūnū; C yāānà; T $n\cdot ą^3h$ net-work bag, T $ži^3ną^2h$ crop (of a bird). (190) M-SM, SE $ya^3ʔa^3$; C ɪ-ʔyāāʔ; T $ya^3ʔa^3h$ chile-pepper. (222) M-SM, SE kūnū to run, to weave; C káánù to run (PMx sandhi); T $(g)u^3ną^2h$ to run, $(g)a^3ną^2h$ to weave. (127) M-SM, SE $la^3k^wa^3$ pus; C yāāk^{w}āʔ pus; T la^3kwe^3h mucus from the nose, kwe^3h pus, (zi^3u^{3-4}) da^3kwe^2h vulva. (218) C ʔkāākù (nąą̄) to prepare little by little; T $(g)a^3ʔnga^2h$ to scrape, $na^3ʔnga^2h$ to whittle.

6.3.3.2. PMx *(3)3 > M mid-low, C mid-mid, and T (3)3 (< PT *22). (242) M-SM, SE kōʔò; C kūʔū; T $go^3ʔo^3$ plate, bowl. (240) M-SM, SE yōkò; T $ža^3ko^3$ honey-bee, honeycomb. (145)

M-SM kū-^{n}ǰāà, M-SE kō-^{n}dēē to be seated; C ?kwīindī (po) (this C form is from fusion of PC *kwɪɪ-ndāā), vāā (pr) to be seated, ?kwɪ̀ndì (po, PC sandhi) to sit down; kò-nę̀ę̀ (po, PC sandhi), ɪ-nę̄ę̄ (pr), kē-nę̄ę̄ (pt) to stay; T (ga^{3})n· e^{3} to sit. (93) M-SM, SE kɪ̄vɪ̀ day; C hūūvē the day; T gwi^{3} day, sun. (45) M-SM, SE sāù rain; C dāāvē thunder; T du^{3}?wi^{3} thunder. (158) M-SM čā?mà flattened; C dɪ̨̀ sɪ̄ɪ?má to flatten (C sandhi); T na^{3}?mą^{3} to cave in. (165) M-SM ?ɪnà, M-SE ?ɪnā dog (cf. 6.2.2.); C ?yáánà dog, ?yú̧ú̧nà fox (PMx sandhi); T žu^{3}ne^{3} fox.

PMx *(3)3? > M mid-low, C mid-low (mid-mid low in CV̄V̄CV̀), and T 3h (< PT *3?). (83) M-SM, SE kū-sɪ̄ɪ̀ (?ɪnɪ́) to be content; C (kūūvà) ?dɪ̨̀ (po, pt), (hɪ́ɪyá) ?dɪ̨̄ (pr̄), (ndɪɪyā) ?dɪ̨́ɪ́ (pp) to become calm; T dī^{3}?ī^{3}h calm, unruffled. (155) M-SM, SE kɪ̨ù four; C kɪ̨ù? four, kɪ̨ɪ̨ hāākū eighty ('four twenties'); T gą^{5}?ą^{3}h (with numeral's tone dropped to tone 5 and subsequent addition of further syllable beyond the old final *-?). (191) M-SM, SE yāà; C ī-yēɪyèì (with the tone development complicated by reduplication and prefixation); T ya^{3}h ashes. (209) M-SM ?ɪsù deer; M-SE ?ɪsū deer (cf. 6.2.2.); C ?yúúdù? horse (PMx sandhi); T žu^{3}ta^{3}h deer. (278) M-SM, SE tē?yù; T ri^{3}?yu^{3}h to rot.

6.3.3.3. PMx *23 > M mid-low; C mid-mid; and T 34 (< PT *23). (38) M-SM, SE kū?ù; C kúú?vè (PMx sandhi); T žu^{3}gwi$^{3-4}$h sister of a woman. (67) M-SM, SE yāù; C hɪɪvā hole; T du^{3} we$^{3-4}$h/w· ehe^{3} cave, cliff. (99) M-SM fɪ̄ɪ̀, M-SE fɪ̄ɪ̄; T yą$^{3-4(-3)}$ salt. (119) M-SM kākà, M-SE kākā quicklime (cf. 6.2.2.); C kāākā quicklime, kūùkù to burn (PC sandhi); T ga^{3}ka$^{3-4}$ to get burned. (128) M-SM, SE yūkù bush, shrub, plant; C kūū (dɪ-yúú?nɪ̨̄?) water-algae; T zi^{3}-kwe$^{3-4}$h/kwehe^{3} herbs. (150) M-SM tą̄?ą̀ to transpire, hā-tą̄?ą̀ (?ɪnɪ̀) to be pleased with; C nę̄?ę̄ to like; T (gi^{3}) rą$^{3-4}$? to fare (well or ill), (g)a^{3}rą$^{3-4}$? (ru^{3}wa$^{2-3}$) to like, to be pleased with. (116) M-SM nūù face of, in front of; C nā-ną̄ą̄ in front of; T yą$^{3-4}$, ri^{3}ą$^{3-4}$ face of, in front of. (Also sets 172, 176, 180, 193, 227, 249, 250, 262, and 267.)

6.3.3.4. PMx *32 > M low-mid, C mid-mid, and T 34 (< PT *23). (4) M-SM, SE vɪ̀šɪ, T gu^{3}ci$^{4(-3)}$ grey hairs. (54) M-SM, SE kàhɪ; C ndāāvā; T na^{3}gwi$^{3-4}$ to choose. (182) M-SM, SE k^{w}à?ā brother of a woman, sister of a man; C kāā?vā brother: T žu^{3}gwe$^{3-4}$h brother of a woman, sister of a man. (221) M-SM nɪ̨̀?ɪ̨̄; M-SE Nɪ̨̀?ɪ̨̄; C dɪ̨́ɪ́?yɪ́ (PMx sandhi); T yą$^{3-4}$? teeth. (237) M-SM, SE sòkō hunger, famine; C kwɪɪkō hunger; T zi^{3}ko$^{3-4}$h stomach.

6.3.3.5. PMx *34 > M mid-mid, C mid-low (mid-low low on CV̄V̀CV̀), and T 45 (PT *34). T has shifted many forms formerly 45 to 34—so that the former has survived only in a few 'fossilized' phrases. (17) M-SM, SE ⁿdūčī beans; C nu̱u̱nę̱ beans (PC sandhi); T ru^{3}ne$^{4(-3)}$ beans, ru^{3}ne$^{4-5}$ (ga^{3}ʔnɪ̄ʔɪ$^{4-3}$) large black beans, ru^{3}ne$^{4-5}$ (gi^{4}ci$^{4-3}$) small varicolored beans. (239) M-SM, SE ⁿdōkō zapote (a tropical fruit); C ndūùkù chiremoya (a similar tropical fruit), ndūùkū (mę̱ʔę̱) anona (another tropical fruit) (C sandhi); T re^{3}ko$^{4(-3)}$ anona, re^{3}ko$^{4-5}$ (čų$^{5-3}$) the black zapote. (18) M-SM, SE ʔɪčī road, direction towards; C yu̱u̱né road (PMx sandhi); T ne$^{3-4}$ʔ direction towards; (63) M-SM, SE nūū to come down; C ndūùvà to arrive from above, kūùvà to arrive descending; T (g)a^{3}wi$^{3-4}$ to go out, (66) M-SM, SE yāū; C hīívà; T du^{3}we$^{3-4}$/w· e$^{3-4(-3)}$ century-plant. (85) M-SM yūhą̄, M-SE ñūhē; C yāàčè; T da^{3}kų$^{3-4}$h/kų̄hų̄^{3} dough. (149) M-SM, SE ndāʔā hand; C kū-tāʔà seize, tāʔā hand (PC sandhi); T gi^{3}da^{3}ʔa$^{3-4}$ to seize. (264) M-SM, SE yūčī powder; C (yą̄ʔę̱́) ndūùtèʔ sand; T ču$^{3-4(-3)}$ powder, da^{3}ču$^{4-5}$(čų^{3}) saw-dust. (277) M-SM tl̃ñ̃, M-SE Ñíñ̃ (PMx sandhi); C ʔyūùdè; T žu^{3}tu$^{4(-3)}$ mouse, žu^{3}tu$^{4-5}$ (gwi$^{5-3}$) rat.

6.3.3.6. PMx *43 > M mid-mid; C mid-low (mid-low low in CV̄V̀CV̀), and T 35 (< PT *24). (8) M-SM ⁿdīī, M-SE ⁿdīhī to return; C kū-čīī to come; T (g)u^{3}či$^{3-5}$ʔ to arrive. (29) M-SM, SE ʔīnī afternoon, early evening; C víínð afternoon, early evening (PMx sandhi); T ni$^{3-5(-4)}$ afternoon, early evening, gi^{3}ni$^{3-5}$ to grow late, zdi^{3}ʔnɪ̄$^{5(-3)}$ supper. (98) M-SM, SE ñ̃iñ̃ī; C yu̱u̱ (PMx sandhi); T zi^{3}-tą$^{3-5}$ʔ/tąʔą^{3} ear of corn. (43) M-SM, SE kānī to pound, to hit; T (g)u^{3}nɪ̄$^{3-5}$ʔ to quarrel. (61) M-SM kūʔū; T ža^{3}ʔwi$^{3-5}$ʔ to rub (clothes on the rocks). (195) M-SM, SE tōō; T nga^{3}ča$^{5(-3)}$ a span (measure).

6.3.3.7. PMx *24 > M mid-low, C mid-mid; T 35 (< PT *24). (For the treating of T 3 4ʔ(3) and 3ʔ(3) as equivalent to 3-5ʔ, see 6.1.4.2.) (43) M-SM kūù; M-SE kūū (cf. 6.2.2.); C ʔkūùvè (PC sandhi); T (g)a^{3}wi$^{3-5}$ʔ to die. (58) M-SM, SE tāčī; C ʔyu̱u̱ná (PMx sandhi); T na^{3}ne$^{5(-3)}$ wind. (71) M-SM hītl̃, M-SE yl̃tī (cf. 6.2.2.); C hēētē; T ži^{3}či$^{3-5}$ʔ intestines. (81) M-SM ⁿdīšl̃, M-SE ⁿdīšī (cf. 6.2.2.); C nā-díʔí, (possibly C sandhi); T di^{3} ci$^{3-5}$ʔ/ciʔi^{3} cactus-beer. (146) M-SM kāʔⁿǰà to cut; C kwę́ę̀ʔ to break (PMx sandhi); T (g)a^{3}ʔne$^{3-5}$ʔ to cut. (157) M-SM, SE ñūʔmà; C ʔyą̄ą̄ʔmē smoke; T yo^{3}ʔo$^{5(-3)}$ the gummy deposit made by smoke from wood-fire. (179) M-SE yūʔvà; C ʔīīʔvā; T ʔweʔe^{3} ice, frost. (234) M-SM SE yūtù; C ī-ʔyúútù (probably PMx sandhi) tump-line; T ži^{3}čoʔo$^{4-3}$ little straw mat on tump line. (There are also the following M, T sets reconstructing unambiguously as

*24: 32, 55, 86, 174, 199, 214, 274).
6.3.3.8. PMx *42 > M low-mid, C mid-mid, T 35 (< PT *24) (For the treating of T 3 4 ?(3) as equivalent to 3-5?, see 6.1.4.2.). (9) M-SM, SE kǐhī fever; C dà-kàǎči to boil (PC sandhi variant), ?yūūčī to fry; T ga^{3}či ?i$^{4-3}$ fever. (11) M-SM, SE čī-^{n}dǔhī to bury; C ?kūūčī to plant, to sow; T (g)a^{3}čį$^{3-5}$? to bury. (96) M-SM, SE sį̀ ?į̄; C dį̄į̄?mą̄; T da^{3}?mą^{5} foot, leg. (217) M-SM, SE kǐkū to sew; C (kā?mą̀) kwāākū to swear, to testify; T da^{3} ?nga?a$^{4-3}$ scar, proof. (265) M-SM, SE tī-k^{w}ǐtī; T ru^{3}gu^{3} ču?u$^{4-3}$ potatoes.
6.3.4. PMx tone patterns occurring only in tone sandhi variants.
6.3.4.0. The six PMx tone patterns restricted to sandhi variants are described in this section. In spite of the sporadic and unpredictable occurrence of reflexes of the sandhi variants in our sets, it is nevertheless possible to reconstruct these six additional patterns with some certainty. This reconstruction is possible because the eight basic PMx tone patterns each had a characteristic tone sandhi variant differing according to the basic tone-class—except that *22 and *24 had the same sandhi variant, as did also *33 and *23. The M, C, T reflexes of a given sandhi variant are regular and consistent—even though the occurrence of those reflexes is rather infrequent and random.

The six tone patterns restricted to sandhi variants have the common feature of being characterized by PMx tone *1 either as the first member of a sequence of two tones, or as the second member of such a sequence, or as the only tone or tones of the sequence. The tone *1 may be considered to be a replacive element replacing one or both of the tones of each of the eight basic patterns. Tone *1 was restricted therefore to tone sandhi variants in PMx. Nevertheless, in view of the fact that some members of each tone-class were characterized by sandhi variation while others were not (there is evidence of such variation in not more than one-third of the sets), all four tones contrasted in some contexts, and there can be no doubt of the phonemic status of the highest level.

The correlation of the tone sandhi variants with the basic tone patterns is as follows: *22 and *24 had sandhi variant *21; *33 and *23 had variant *11; *34 had variant *14; *43 had variant *13; *42 had variant *41; and *32 may possibly have had two variants even in PMx times: *31 (in what later became M) and *12 (in what later became C and T). In positing a PMx isogloss thus separating the area in which the *31 variant was current from the area in

which the *12 variant was current, I do not mean to imply a common C, T pedigree as opposed to M but am simply delineating one isogloss in a network of intersecting—and very probably ill-correlating—isoglosses.

6.3.4.1. PMx tone sandhi variant *21 > M high-mid (M-SE high-low under obscure conditions in some sets); C high-high in CV́V́CV́ and CV́?V́, but high-low in CV́V́CV̀? and CV́?V̀? (and in a few such forms that have recently lost *-?); T 2-1 (< PT *1?) and 2 (< PT *1). The following sets contain M witness to PMx *21 sandhi variant: 179, 272. The following sets contain a C witness to *21: 19, 21, 37, 39, 76, 78, 81, 107, 110, 123, 159, 222, 229. The following sets contain a T witness to *21: 24, 37, 47, 68, 74, 76, 105, 111, 123, 134, 159, 222, 225. Notice that sets 37, 76, 123 and 159 contain both a C and a T witness to *21.

6.3.4.2. PMx tone sandhi variant *11 > M high-high (M-SE mid-high under obscure conditions in some sets); C high-low (CV́V́ under obscure conditions in a few sets); T 25/2h (< PT *12? > later T *23? > 25h, or 32h by shifting of contrastive tone to last syllable, see 6.1.4.3.); and 23 (< PT *12); the disyllabic 23 forms have become 3 2-3 in some situations by shifting of contrastive tone to last syllable (see 6.1.4.3.). The following sets contain a M witness to *11 sandhi variant: 10, 97, 136, 142, 177, 194, 273. The following sets contain a C witness to *11: 20, 38, 114, 118, 142, 165, 170, 172, 176, 180, 209, 220, 249. The following sets contain a T witness to *11: 12, 143, 176, 220. Notice that both M and C have witness to *11 variant in set 142, and both C and T in sets 176 and 220.

6.3.4.3. PMx tone sandhi variant *14 > M high-mid (high-low in M-SE under obscure conditions in some sets); C high-high; T 25h/2h or 23 (see above paragraph). The following sets contain a M witness to *14 sandhi variant: 3, 59 (but the M form may here be a PM sandhi variant resultant on addition of fused element represented by s- causative), 189 (with M-SE anomalous reflex CV́V́). The following sets contain a C witness to *14: 18, 59, 116, 135, 169 (high-high may here be a C sandhi variant after ndūūtē egg, fruit; 171, 223, 241. Only set 3 contains an unambiguous T witness to *14. Notice that both M and C witness to *14 variant in set 59, and both M and T in set 3.

6.3.4.4. PMx tone sandhi variant *13 > M high-mid; C high-low in CV́V́CV̀, but high-high in CV́V́; and T (presumably) 25h/2h or 23. Only set 29 contains a M witness to *13. The following sets contain a C witness to *13: 29, 98, 154. The following sets contain an ambiguous T witness to *14/*13 (< basic *34/*43); the T

reflex is 23 (PT *12): 35, 36, 56. Only set 154 contains an unambiguous T witness to *13 in that the potential ambiguity of *14/*13 is resolved by the C witness to *13 in that set.

6.3.4.5. PMx tone sandhi variant *41 > M low-high; C high-low in CV́V́CV̀, but high-high in CV́V́; and T 2-1 (< PT *1?) or 2 (< PT *1). The following sets contain a M witness to *41: 46, 62, 70 (but the M cognate in the latter is highly suspect in that it has preposed tī-, which seems to have conditioned some PM tone sandhi variation). Only set 178 contains an unambiguous C witness to *41. The following sets contain a T witness to *41: 130, 184, 232. Set 213 contains but a M-SM form and a T form, both of which hark back to *41. In that the cognates here come from just one M dialect and T, it is probably too weighty a conclusion to see in this set evidence for basic pattern *41 in PMx forms. More likely, we have here a fragmentary set with all the surviving forms harking back to a PMx *41 sandhi variant.

6.3.4.6. PMx tone sandhi variants of *32 give the following reflexes: (a) variant *31 > M low-high; (b) variant *12 > C high-high; T 2h or 23 (see 6.3.4.2.). The following sets contain a M witness to *31 sandhi variant: 23, 53 (only M-SE), 247. The following sets contain a C witness to *12 sandhi variant: 60, 221, 247. The following sets contain a T witness to *12: 16, 22, 60, 208, 212. Notice that both M and C bear witness to sandhi variant of basic *32 in set 247 and both C and T in set 60. Set 1 seems to preserve only sandhi variants of *32 in all three languages. This set and 213 mentioned above under 6.3.4.5. may possibly bear witness to the occurrence of basic tone patterns involving tone 1, but the evidence is too slight at present to establish this conclusion. It is clear, however, that even if tone patterns involving tone 1 were basic in some PMx forms, the number of forms occurring with such basic tone patterns was extremely limited (cf. M-SE where there are but nine couplets with basic tone patterns involving M-SE tone 3; see 6.1.2.1.).

7. Array of M, C, T cognates

7.0.1. The sets are grouped here according to the consonant and vowel of the reconstructed ultima of the PMx forms. This coincides with the M, C, T ultima except that (1) *CV?V syllables regularly become disyllabic in M, C, T (cf. 5.0.2.). (2) Some *CV? forms have been sporadically expanded in M, C, or T by rearticulation of the vowel after the glottal stop; a form thus treated becomes disyllabic (cf. 5.4.1.). (3) Some *CV forms come down as M CVV, which patterns as disyllabic. Presumably PMx *CV was phonetically lengthened; this length still exists in C and T; but C CVV units are monosyllabic and T word-final CV is phonetically but subphonemically lengthened (cf. 2.2.2.2., 2.2.2.3., and 5.0.2.).

It is advantageous to group the forms according to the *CV of the reconstructed ultima in that (a) the ultima is the place of greatest phonological variety in PMx—since several consonants and three of the vowels do not occur in penultimate syllables; (b) the modicum of consonantal alternation in the ultima gives these syllables a stability not found in penultimate syllables; (c) in so grouping the sets similar roots are brought together in the same section; and (d) some sets have penultimate syllables and some do not, but the consonants and vowels of the ultimas of reconstructed disyllabic forms receive the same phonological treatment in M, C, T cognates as do the consonants and vowels of reconstructed monosyllabic forms. I therefore consider that all PMx forms consist of an ultima plus or minus a penultimate and—much more rarely—a prior syllable. In grouping the sets according to the ultima we bring together the data so as to exhibit the most varied, basic, and comprehensive points of similarity.

Each entry in the array of cognates consists of three parts. (1) In parentheses immediately following the form, the reconstructed PMx tones are given. (2) Immediately follows the citation of M, C, T cognates. (3) At the close of each entry appears a brief gloss of (a) the consonantal alternations—if any—that characterize the ultima, and of (b) the reconstructed PMx penultimate along with any penultimate M, C, T developments.

7.0.2. The reconstructed basic tone pattern is given for each set in which such reconstruction has been possible. Where one or more alternative tone reconstructions are possible, these alternative possibilities are given with intervening slash (/). Where some forms of a given set reconstruct with one basic tone pattern while other forms of the same set reconstruct with another basic tone pattern, these two reconstructed tone patterns are given with intervening comma. After a semicolon there is indication of any sandhi variations to tone patterns involving a replacive *1 on either or both members of the reconstructed tone pattern assumed to be basic; the language or languages bearing witness to this sandhi variation are indicated. Therefore, the formula (*22/*23; T *11) may be read as follows: "Either proto tone couplet *22 or *23 may be reconstructed; a sandhi variation to proto tone couplet *11 is indicated by the T cognate(s)." Similarly, the formula (*34, *23; M *14) may be read, "Both proto tone couplet *34 and *23 need to be reconstructed to account for all the forms of this set; a sandhi variation to *14 is indicated by the M cognate(s)." Also note in regard to the tone reconstruction that (a) Post-PMx sandhi variations to high in either M or C are ignored in the formulae; e.g. M-SM high attributive tone (6.1.1.4.), and early M sandhi variations to high conditioned in some forms by such elements as preceding tī- animal thing or s- causative; and certain C tone sandhi variants described in 6.1.3. and 6.3.1.0.3. (b) Ambiguity in regard to the reconstructed basic tone pattern in a given set is resolved in a number of instances by taking account of the reflex of a PMx sandhi variant in that set. For example, in a set where the occurrence of M mid-mid indicates that PMx *22/*34/*43 is to be reconstructed, the occurrence of a T 21 or 2 reflex of a PMx sandhi variant in that set resolves the ambiguity in favor of *22, since *34 and *43 did not have PMx sandhi variants that give T reflex with 21 or 2, but rather with 2h or 23.

7.0.3. Mixtec verbs are cited in both the potential and continuative (e.g. kā?mū, há?mū); a further form, the completitive, consists in M-SM of a preposed nì followed by verb with the segmental phonemes of the continuative but with the tone couplet of the potential (i.e. nì-hā?mū for the verb just cited). In M-SE nī is preposed with sandhi variation of the tones of the following verb provided that the verb belongs to a tone class characterized by such variation. The nì/nī forms are not cited here in that they seem to have little diachronic pertinence. (4.1.)

7.0.4. In Cuicatec verbs the following forms are cited in the order here given: po (potential), pr (present), pt (past), pp (prior

past). Deviations from this order are made whenever it is possible to cite together two homophonous aspects of the same verb; such deviations from the order here established are indicated by the use of the abbreviations just given.

7.0.5. Trique nouns are cited with the possessed form first (if it is distinct from that of the non-possessed), then the non-possessed: e.g. $da^3k\tilde{a}^{2-1}/k\tilde{a}^3$ squash. Trique verb forms are cited with the aspectual prefix in parentheses: $(g)a^3\check{c}a^{2-1}$ sing. The synchronic analysis represented by the parenthesis must not be allowed to obscure the fact that diachronically the entire penultimate syllable is a unit, e.g. ga-< *ka in the verb just cited. Such a prefix may be added before a fortis nasal, lateral, or semi-vowel only with a compulsory alternation of the fortis consonant to the corresponding lenis: e.g. $(ga^3)n \cdot e^3$ sit indicates two forms, $n \cdot e^3$ sitting and ga^3ne^3 sit, sat. With a tone substitution in the latter form, a further form ga^4ne^3 will sit occurs. The development of the latter sort of forms is peculiarly T; such forms are not indicated in the array of cognates except where they may have possible diachronic pertinence.

7.0.6. Amuzgo forms are cited when known and presumably cognate. They are taken account of in no systematic way.

7.0.7. In the brief gloss concluding each entry, the following abbreviations and symbols are used: ult syll (ultimate syllable), plte syll (penultimate syllable), slash (/) for alternative reconstruction of penultimate syllables, and { } to indicate a plausible reconstruction (in terms of 4.1.) but nevertheless a reconstruction with alternative possibilities. In regard to the latter it is especially instructive to note that merger of five PMx *CV elements into T ga- requires us to thus label certain T penultimate reconstructions as simply plausible with especial frequency. The penultimate reconstructions are as stated and discussed in detail in section 4.

7.0.8. In general M, C, T penultimate elements are considered to be continuations of PMx penultimate, (a) if the phonological developments conform to those described in 4.2. - 4.3., and (b) if the reconstructed elements together form a plausible pattern in terms of paradigms A and B as described in 4.1. While the latter criterion must admittedly be applied with caution, it seems plausible that if there are, e.g. M, C *yu penultimate elements and a T *tu penultimate ('t' declension) alongside a C penultimate element which would reconstruct as *ya, then the latter may simply mirror a C development (set 165). In respect to the first criterion, fusions of the sort described in 4.4.-4.7. are consistently considered

to be post-PMx, i.e. M, C, or T developments. Judgments of this sort are expressed by the following device: asterisked forms not followed by hyphen are PMx unless labelled PM, PC, or PT; penultimate elements considered to be M, C, or T developments are cited without asterisk and followed by hyphen. For example, note the entry in 182: 'plte syll: M, C *k^{w}a; T adds žu^{3}- animal' —in which the latter element is assumed to be a T development, while the penultimate M, C elements are considered to hark back to PMx *k^{w}a.

The difficulty of such judgments as these relating to the status of a given element as PMx or post-PMx underscores one of the reasons behind my marshalling the M, C, T cognates here in this section in such detail. It is my hope that this marshalling of the data basic to the study will be sufficiently detailed and comprehensive that the reader so inclined will be able to inspect the data in his own right and to challenge, if necessary, some of my conclusions. In such discussion further insights may be gained into the phonological and grammatical structure of PMx.

*ki

1. (*32; M *31, *12; C, T *12) M-SM táhí, M-SE tàhí, M-J tači to send; C téétté, ī-téétté, tɛ̀ètɛ̀, nī-téétté; T ri^{3}ki$^{2-3}$ to give. Plte syll: M, C *ta; T ri- < fused čV- element.

2. M-SM čîī; M-SE čîhī; M-J tiči stomach; T ri^{3}ki^{3}. No plte syll. M-J has fused ti < tī animal, thing; T has ri- < ču^{3}h oval shaped. The fused M, T elements may hark back to PMx *tu$^{?}$ oval shaped, but the fusions are presumably post-PMx.

*k^{w}i

3. (*34; M, T *14) M-SM čī-súkū, čí-súkū, M-SE čū-súkú, M-J ti-sukų, $^{?}$i-sukų to wrap up, to wrap around; C k^{w}āàkù, hāàkù, čāàkù, ndāàkù; T na^{3}kwi$^{2-3}$ to wind up, to coil up. Plte syll: M *θɔ; C has fused auxiliary verb harking back to PMx *k^{w}a, *xa, *ka, *^{n}da—with *ka leveled to ča in late analogical development; T *^{n}dɔ.

*θi

4. (*32) M-SM, SE, J vìšī; T gu^{3}ci$^{4-3}$ grey hairs. Plte syll: M*wi; T *k^{w}i.

5. (*24, *42) M-SM vīšî, M-SE vīšî/vīšį, M-J viši sweet M-SM, SE, J ^{n}dùšī honey; C nā-dī$^{?}$ī honey, čyāādē sugar; T zi^{3} ci$^{?}$i$^{4-3}$ candy, ga^{3}ci$^{?}$i$^{4-3}$ honey; A tši sweet. Plte syll: M *wɔ,

*ⁿdɔ; C has some fused čyaa- element; T has fused zi^{3}- that which, and *kɔ/*kʷɔ.

6. (*32/*42) M-SM šìī; T ci^{5} tough.

7. (*22) M-SM kāšį̄, hášį̄, M-SE kāšį̄, hèšį̄, M-J kaši, časi to nurse; C dą̄į̄ drop; T di^{3}ci^{3} breast, (g)u^{3}ci^{3} to nurse, ci^{3}, ri^{3} ci^{3} a drop, small quantity of: A tsęį?. Ult syll: M, T *θ-; C *y-. Plte syll: M *ka, *xa; C *θa; T *θa, *kʷa and ri- < ču^{3}h oval shaped.

*xi

8. (*43) M-SM ⁿdīī, M-SE ⁿdīhī, M-J kiči, vači to return; M-SM, SE vàhī is coming; C kū-čīǐ (po, pt, and pp), ī-čīǐ (pr) to come; T (g)u^{3}či$^{3-5}$? to arrive. The medial consonant has been reduced in M-SM under obscure conditions. Plte syll: M *ⁿdi, *ki and wa-; T *kʷi.

9. (*42) M-SM, SE kȟī fever; C dà-kààčī, ī-dà-kààčī, dā-kààčī, nī-dī-kāāčí to boil, ?yūūčī, ī-?yūūčī, ?yūǔčǐ, nǐ-?yǔǔčǐ to fry; T ga^{3}či?i$^{4-3}$ fever. Plte syll: M *kɔ; C *kɔ, *yɔ; T *kɔ/*kʷɔ.

10. (*33, M, T *11) M-SM ⁿdą́hǐ to untie, ⁿdį̨hį̨ wing, M-SE ⁿdāhǐ to untie, ⁿdį̨hę̨ wing, M-J ⁿdači to untie, ⁿdičį wing; C ?tēēčē, ī-?tēēčē, ?tēèčè, nǐ-?tēēčē to untie, to loosen, nā-?tēēčī (po and pt), ī-nā-?tēēčī (pr), nǐ-nǐ-tēēčī (pp) to loosen, ndūūčī (po and pt), ī-ndūūčī (pr), nǐ-ndūūčī (pp) to awaken, n?dùùčī (po and pt), ī-n?dùùčī (pr), nī-n?dùùčī (pp) to awaken (someone), hēèčè wing, arm; T na^{3}či^{3} to untie, to loosen, na^{3}či$^{2-3}$ rough, splintery, na^{3}či^{3} to awaken, hna^{3}či^{3} to awaken (someone), du^{3}gwa^{4}či^{3} or zi^{3}-gwa^{4}či^{3} wing; A tski, ntski wing. Plte syll: M *ⁿda, *ⁿdi; C *ti, *ⁿdɔ, *xi; T *ⁿda, *ⁿdɔ, {*ka}. The cognates of this set probably involve mixture of forms from several PMx nouns traceable to the same root but with varying plte syll.

11. (*42) M-SM čī-ⁿdùhī or yùhī, M-SE čī-ⁿdùhī, M-J kuči to bury; C ?kūūčī, ?īīčī, c?īǐčǐ, n?dǐǐčǐ to plant, to sow; T (g)a^{3} čį̄$^{3-5}$? to bury. Plte syll: M *ⁿdɔ, with ku- as an analogical development in M-J; C *kʷɔ, *xɔ/*yɔ, *kɔ, *ⁿdɔ (with vowel palatalization in the last three tenses); T *kɔ/*kʷɔ.

12. (*33/*23; T *11) M-SM ?ā-ⁿdūhį̄, M-SE hē-ⁿdūhį̄ the past year; T (g)a^{3}čį̄$^{2-3}$ to pass, yo^{3}? ga^{3}čį̄$^{2-3}$ the past year. Plte syll: M *ⁿdɔ; T *kɔ/*kʷɔ.

13. (*23; C *11) M-SM sāhi̱, M-SE sāhī̱, M-J sači nephew; C húúčè niece; T du^{3}gwa^{3}či$^{3-4}$? niece. (Similarly, M 'niece'~ CT 'nephew,' set 244). Plte syll: M *θa; C *xɔ; T *xɔ/*xa (with PT *ga- > gwa after preceding du-).

*x^{w}i

14. (*23; C *11) C (kūūvē) ndúúkù to be joined; T du^{3}gwi$^{3-4}$? together with, companion, neighbor, relative. Plte syll: C *^{n}dɔ; T *θɔ.

15. M-SM, SE káhí, M-J kači̱ clear, clearly, M-SM (kq̱?i̱) káhí to talk clearly; T gwi^{5}? quickly, (ga̱^{3}ta$^{3-4}$h) gwi^{5}? to say quickly. (But cf. *x^{w}e, the reconstruction of *x^{w}i vs. *x^{w}e is ambiguous without a C witness).

*^{n}di

16. (*32; M-SE *31, T *12) M-SM tìčī, M-SE tìčí, M-J titi; C nu̱u̱nę̱; T ru^{2}ne^{3}; A tai ntæ? avocado. Plte syll: M *tu; C *^{n}du; T ru- < ču^{3}h oval shaped, fruit. These various M, C, T elements probably all hark back to PMx *tu? fruit, oval shaped, but the T cognate has analogically reshaped the old PMx plte in accordance with the recent fusion of ču^{3}h in that language.

17. (*34) M-SM, SE ^{n}dūčī, M-J ^{n}duti; C nu̱u̱nę̱/nu̱u̱ni̱; T ru^{3} ne$^{4-3}$ beans, kidneys; ru^{3}ne$^{4-5}$ (ga^{4}?nɨ?ɪ$^{4-3}$) large black beans, ru^{3}ne$^{4-5}$(gi^{4}ci^{3}) small, vari-colored beans; A ntæ beans, ntæ? kidneys (cf. T zi^{3}-ru^{4}ne^{4} kidneys.) Plte syll: M, C *^{n}du, T ru- < ču^{3}h oval shaped. The T cognate probably reflects late analogical reshaping as suggested in 16.

18. (*34; C *14) M-SM, SE ?īčī, M-J ?iti road, direction, towards; C yu̱u̱nę̱ road; T ne$^{3-4}$? direction towards. Plte syll: M, C *yu. T possibly had an original *yu element that was lost without strengthening PT n > n·, since the T cognate usually occurred in positions of relatively lessened stress.

*li

19. (*22; C *21) M-SM lúlí, M-SE lūlí, M-J lu?u or lu?u, M-M čili or lo?o; C ?li̱li̱; T l· i^{3}h little. Plte syll: only varying sorts of reduplications in the M dialects. T l· may indicate that the PT root was also reduplicated and that a plte syllable has been lost. In this case the reduplication may be a PMx development.

*mi

20. (*23; C *11) M-SM ñā?mù, M-SE ñā?mū, M-J ya?mi;

C ?mĩ̱ sweet potato, tubular root; T du^{3}mi$^{3-5}$?/m·i?i^{3} soap-root, soap, du^{3}mi$^{3-4}$/m·i^{3-4-3} sweet potato, tubular root. The soap-root is a tubular root resembling the sweet potato. The absence of the glottal stop in the second T word is obscure (cf. 5.6.) Plte syll: M *ña, *ya; T *θa.

21. (*22; C *21) M-SM kā?mū, há?mū, M-SE kā?mū, hé?mū, M-J ka?mi, ča?mi to burn something; C ?kṵ́ṵ́?mí, ?i̱?i̱, č?i̱?i̱, ?ní?i̱ to set fire to; T (g)a^{3}?mą^{3} to be warm, ną^{3}?ą^{3} to smart, to be irritated. ną^{3}?ąhą$^{4-3}$ quicklime. (g)a^{3}?mą^{3} ru^{3}wa$^{2-3}$ to be angry; A hmąi̱? hot, angry. Plte syll: M *ka, *xa; C *k^{w}a, *xa, *ka, *^{n}da (with vowel palatalization in the last three tenses); T {*ka}, *na.

22. (*32; T *12) M-SM, J, M tṵ?ṵ̱ word, ^{n}dā-tṵ?ṵ́, to converse. M-SE Nṵ?ṵ̱ word, ^{n}dā-Nṵ?ṵ́ to converse; T ną^{3}?ąhą$^{4-3}$, zną^{3}?ąhą$^{4-3}$ conversation, ną^{2}?ąhą$^{5-4}$ incantations, chants, nu^{3} gwą?ą$^{4-3}$ word, na^{3}h/zna^{3}h language (classificatory noun with recent denasalization in proclitic position); A n?am word, nam? to send word. Plte syll: M, T *tna/*tnɔ; T *na/*nɔ.

23. (*32; M *31) M-SM, SE, J, M šṵ?ṵ́ money, bit (12 1/2 centavos), M-SM, SE M šṵ́?ṵ́ bright, shining; T zą^{3}?ąhą$^{4-3}$ money, ząhą^{3} bit, zi^{3}-mi$^{2-1}$ (ču^{3}h) yolk (of an egg); mi$^{1-2}$ copper-colored, yellow. Plte syll: M, T *θi.

*ni

24. (*24; C, T *21) M-SM, SE ñānì, M-J yani brother of a man; C ?díínó brother; T di^{3}ni$^{2-1}$ brother of a man. Plte syll: M *ña, *ya; C, T *θa.

25. (*43) M-SM, SE J kānī, kánī to pound, to hit; T (g)u^{3} nï$^{3-5}$? to quarrel, to fight. Plte syll: M *ka; T *k^{w}a.

26. (*34) M-SM, SÈ, J kīnī disgusting, repulsive, M-SM hā-kíṇī, M-SE (hēē) kīnī to be disgusted, M-J sa-kini to disgust; C tū-vīīnú, ī-tū-vīīnú, tū-vīīnú, nī-tū-vīīnú to disgust, to offend, (kūūvē kāà) ?vīīnō to be disgusted; T ni^{3}nïhï$^{4-3}$ dirty, disgusting. Plte syll: M *ki; C *wi; T *ni.

27. (Possibly *43 in view of T retention of *?n; C tones by C sandhi rather than PMx sandhi) M-SM tī̄-hánî, M-SE (sè?ē) čánî, M-J (se?e) yani grandson; C (dāīyā) déénó granddaughter, (dāīyā) híínó grandson; T (da^{3}?ni$^{2-1}$) zi^{5}?nï^{5} grandchild. Plte syll: M *xa, *ya; C *θa, *xa; T has fused zi^{3}- that which or zi$^{2-1}$ he that.

28. (*33/*22, *24; C *21) M-SM kūnȉ, hīnȋ, M-SE kūnī hȋnȋ to see, to know, M-SM, SE kūnī (sð?ō,) hȋnī (sð?ō) M-J kuni (so?o), čini (so?o) to hear; C k^{w}ȋȋnó, ?ȋȋnó, čȋȋnð, nȋȋnó to look at; T (g)u^{3}nȋ^{3} to hear, (n·e$^{3-4}$) gu^{3}nȋ?ɪ$^{4-3}$ mirror. C ?kūūnī and T (gi^{3})ni^{3}?i^{3} to see may be borrowings from M. Plte syll: M *k^{w}i, xi-, C *k^{w}i, *yi, *ki, *^{n}di; T *k^{w}i. M has analogically replaced *y of old 'y' conjugation with x.

29. (*43; M, C *13) M-SM, SE ?īnī afternoon, early evening, kū-šȋnī to eat supper, M-SM, SE šȋnī supper, M-J čeni afternoon, early evening; C vȋȋnð afternoon, early evening, (čé?é) vȋȋnð to eat supper; T ni^{3-5-4} afternoon, early evening, gi^{3}ni$^{3-5}$ night fall (verb), zdi^{3}?nȋ$^{5-3}$ supper. The first two T words involve again a reflex i where we would expect ɪ; maybe i reflex here and in the previous set involves (a) borrowing from M, or (b) special conditioned sound change in T after prefixal i when there is no intervening ?, or (c) separate dialect developments in T with subsequent dialect borrowing. Plte syll: M *yi, *θi; C *wi; T *ki, PT *ždi. The loss of the first syllable in T ni^{3-5-4} without strengthening of n > n· raises a phonological problem.

30. (*33/*23/*24) M-SM ?īnȉ insides, non-physical, metaphorical (latter meanings when constituent of a verb phrase), M-SE ?īnī insides, nī metaphorical, non-physical (in verb phrase), M-J ?ini (only in verb phrase) C hȉȉnō insides, non-physical (only in verb phrase); T ?nȋ^{5}h inside of (verbal attributive). Plte syll: M *yi; C *xi.

31. M-SM, SE, J, M ?ūnȉ; C ?ȉȉnù; T wa^{5}?nȋ^{5}h three (the M here may have analogically leveled the tones of this numeral to mid-low from some former pattern; it is no doubt significant that all M numerals from '2' to '10' have mid-low tones). Plte syll: M, C, T *wa.

32. (*24) M-SM tȋ-kū?nȉ; T ži^{3}?nȋ?ɪ$^{4-4}$ group, herd. Plte syll: M *k^{w}i; T *xi/{*ti}.

33. (*22/*24/*42; T *21/*41) C kā-kū-?nu̱ų̱ (po and pt), ī-kū-?nu̱ų̱ (pr), nȋ-kȗ-?nu̱ų̱ (pp); T (g)a^{3}?nȋ$^{2-1}$, ga^{5}?nȋ^{5}h to put in (cf. 30). Plte syll: C *k^{w}a/*kɔ; T {*kɔ}.

34. (*43/*24/*42) C dà-?nu̱?u̱ (po and pt), ī-dà-?nu̱?u̱ (pr), nī-dā-?nu̱?u̱ (pp) to move, to stir; T na^{3}?nȋ$^{3-5}$? to wash out (a dish or pan). Plte syll: C *θa; T *na.

35. (*34/*43; T *14/*13) M-SM kānī (?īnȉ), M-SE kānī-nī

to think; C ?nu̱u̱ (hĭĭnō) (po and pt), ī-?nu̱u̱ (h.) (pr), nī-?nu̱u̱ (h.) (pp) to think, to doubt; T (g)a^{3}nĭ$^{2-3}$ (za^{5}? ru^{3}wa$^{2-3}$) to have a generous impulse, na^{3}nĭ$^{2-3}$ (ru^{3}wa$^{2-3}$) to think, to be sad. Plte syll: M *ka; T {*ka}, *na.

36. (cf. 35) M-SM kānī, hánī, M-SE kānī, hénī to put in place, to set up; C ?kạ̱ạ̱nu̱, ?īīnǭ, č?īīnu̱, ?nīīnu̱; T (g)a^{3}nĭ$^{2-3}$ to set up, to stand up, to erect. This is probably the same root as the preceding set. Plte syll: M *ka, *xa; C *ka, *xa, *ka, *^{n}da (with vowel palatalization in the last three tenses.)

37. (*24; C, T *21) M-SM, J nūnì; M-SE nūnī corn; C nu̱u̱nǫ́ corn, nu̱u̱nǭ (ndūūčà) pozol; T di^{3}?nĭ$^{2-1}$/?nĭ$^{1-2}$ corn. Plte syll: M, C, T *^{n}du.

*wi

38. (*23; C *11) M-SM, SE kū?ù sister of a woman; C kúú?vè sister; T žu^{3}gwi$^{3-4}$h sister of a woman. Plte syll: M, C *k(^{w})V-; T *tV-.

39. (*22; C *21) C ndúú?vé eruption of the skin, pimple; T ya^{3}?wi^{3} boil, carbuncle. Plte syll: C *^{n}dɔ; T *yɔ.

40. (*23/*32/*34) C tāāvē a pile; T na^{3}wi$^{3-4}$ to pile up. Plte syll: C *ta; T *na.

41. (*22/*33) C yúūvè toe-nail; T-Ch a^{3}wi^{3}, T-Co yawi head. For the semantic shift involved, cf. M-SM expression šīnì ^{n}dá?ā, 'head of the hand,' i.e. finger. Plte syll: C, T *yɔ.

42. M-SM, SE ?ūù, M-J, M *?uvi two; C ?ūùvè two, dī-?ūūvē twins, nā-?ūūvē some, a few; T w·i^{5}h two (cf. T žu^{5}wi^{5}h twelve); A we two. M may have analogically leveled to mid-low from some other tone pattern, cf. 31. Plte syll: some sort of PMx reduplication; possibly *wi-wi. T lost plte syll and strengthened w > w·.

43. (*24) M-SM kūù, hí?ì, M-SE kūū, hí?ì, M-J kuvi, či?i, M-M hi?i; C ?kūùvè, ?īī, čīī, n?dīī; T (g)a^{3}wi$^{3-5}$?; A kue? die. Ult syll: M *w-, *x-; C *w-, *x-, *k-, *^{n}d-; T *w-. M creates new final syllable after old ultima by rearticulating vowel after *-?. Plte syll: M, C, T *k^{w}ɔ.

44. (*33; M-SE *11) M-SM tāù, tāú, to owe, M-SM, SE ^{n}dá?ú poor, M-J ^{n}da?vi poor, M-SE táú to owe; T da^{3}?wi^{3} to owe. Plte syll: M *ta, *^{n}da; T *^{n}da.

45. (*33) M-SM, SE sāù, M-J savi rain, M-SM SE sà?ū to submerge; C (dāī-)nkūúvè rain drops, dāāvē thunder, (kwę̱ę̱-)kúvè to rain; T-Ch du^3?wi^3, T-SD do^3?o^3 thunder, rain-diety, T-Co yuwi rain; A lui? to blink, to flash lightning, nda sua?, nda lua? rain-water, tsue (sg) ntue (pl) lightning. It may be necessary to reconstruct two forms here—one with and the other without *?; cf. 44. Plte syll: M *θa; C *θa, and ku-(possibly < *k^wa); T *θa, *ya.

46. (*42; M *41) M-SM, SE sàú, M-J savi; T zdu^3?wi^{5-3} Indian, non-spanish-speaking; A katsue (sg), kalue (pl) Mixtec Indian. It may be necessary to reconstruct two forms here—one with and the other without *?. cf. 44, 45. Plte syll: M *θa; PT *žda.

47. (*22; T *21) M-SM tāū to roast, to toast; T ru^3wi^2 to roast over hot coals. Plte syll: M *ta; T has ru- < čV- fused element.

48. (*22) M-SM, SE, J kūū to exist, to be, to be able, ^{n}dūū to become; C kūūvē, hīī, čīī, ndíí to complete (head of many verb phrases); also note as constituent of the following: nā-ndūūvī ?vīīkū (po and pt) ī-nā-ndūūvī ?vīīkū (pr), ní-ndúúví ?vīīkū (pp) to bless animals, ndūūvē ?vīīkū, ī-ndūūvē ?vīīkū, ndūùvè ?vīīkū, nī-ndúúvé, ?vīīkū to bless; T $(ga^3)w \cdot i_ę^3$ to be, to become, $(ga^3)na^3wi_ę^3$ to get well, to heal, $(ga^3)na^3wi^3$ to be finished, to come to an end. Ult syll: M, T *w-; C *w-, *x-, *k-, *^{n}d- (with vowel palatalization in the last three tense forms). Plte syll: M *k^wɔ, *^{n}dɔ; C *k^wɔ, *^{n}dɔ; T {*k^wɔ}, *nɔ.

*yi

49. (*22; C *21) C kę́ę́; T $ža^3i_ę^3$ mosquito. Plte syll: C *ka; T *ta.

*te

50. M-SM kōð yúčí, M-SE kōð yùčí, M-J ku-yoti alligator; C ?yáátế lizard. Plte syll: M *yam; C *ya.

*θe

51. M-SM šīī, M-SE šīšī, M-J čiši; C dūūdē aunt. Plte syll: M, C *θɔ. There was possibly a PMx reduplication *θɔ-θɔ.

*xe

52. (*32, with obscure M-SE mid-mid) M-SM ^{n}dàhī, M-SE

^{n}dāhī to get wet; T (g)u^{3}če$^{3-4}$ to be wet. Plte syll: M *^{n}da; T *k^{w}a.

53. (*32; M *31) M-SE ^{n}dùhí; T žu^{3}če$^{4-3}$ hens, domestic fowl. Plte syll: M *^{n}du; T *tu.

*x^{w}e

54. (*32) M-SM, SE kàhī, M-J kači; C ndāāvā, ī-ndāāvā, ndāàvà, nī-ndāāvá; T na^{3}gwi$^{3-4}$ to choose. Plte syll: M *ka; C, T *^{n}da.

*^{n}de (Sets without C witness are ambiguous in that they could be either *^{n}de or *^{n}di.)

55. (*24) M-SM, SE yūčī knife; T-Ch n· e$^{3-5}$ (ka^{3}) scissors, T-Co n· e knife. Plte syll: M *yam/*yɔ. T loss of plte syll is indicated by strengthening of n > n·.

56. (*34/*43; T *14/*13) M-SM, SE kūčī, híčī, M-J kuti, čiti; T (g)a^{3}ne$^{2-3}$; A -ndæ, kandæ? to chew. Plte syll: M *k^{w}a/*k^{w}ɔ, *xi; T {*k^{w}ɔ}.

57. M-SM víčí, M-SE vīčí; T n· e^{5} naked. Plte syll: M *wi/*wɔ, T loss of plte syll is indicated by strengthening of n > n·.

58. (*24; C *21) M-SM, SE tāčī, M-J tati; C ?yu̯u̯ná; T na^{3} ne$^{5-3}$; A hnde wind. Plte syll: M *ta; C has ?yu̯u̯ (cf. first syllable of C in 209); T *na.

59. (*34; M, C *14) M-SM, SE kūčī, híčī, M-J kuti, čiti take a bath, M-SM skúčī, M-SE skúčī, to bathe (someone); C ku̯u̯ná, hu̯u̯ná, nu̯u̯ná to take a bath, kā-?kúúná, ī-?kúúná, čī-?kūùnà, nī-?kúúná to bathe (someone). T (g)a^{3}ne$^{3-4}$ to take a bath, du^{3}gwa^{3} ne$^{3-4}$ to bathe (someone). Plte syll: M *k^{w}a/*k^{w}ɔ, *xi; C *k^{w}a, *xi, *ka, *^{n}da (with vowel palatalization in the last two tenses and with C nasalization throughout one verb), *k^{w}a/*k^{w}ɔ; T *ka/*k^{w}ɔ (with PT ga > gwa after previous du-).

60. (*32; C, T *12) M-SM, SE kùčī, híčī, M-J kuti; C kúúná (di̯i̯), híína (di̯i̯) čīīnà (di̯i̯), níína (di̯i̯); T ga^{2}ne^{3} to ripen. Plte syll: M *k^{w}a/*k^{w}ɔ, *xi; C *k^{w}a/*k^{w}ɔ, *xi, *ka, *^{n}da (with vowel palatalization in the last two tenses); T *ka/*k^{w}ɔ.

*we

61. (*43) M-SM, J kū?ū; T ža^{3}?wi$^{3-5}$? to rub (of washing clothes on the rocks); A -?ue to massage. *we vs. *wi is ambiguous here without a C witness. Plte syll: M *k^{w}a; T *ta.

62. (*42; M *41) M-SM, SE yù?ú, yú?ú, M-J yu?vi be afraid; C kā-ndīì?và, ī-ndīī?và, čī-ndīī?và, nī-ndīì?và, to frighten, dīɻ-?vā?à (po and pt), ī-dīɻ-?vā?à (pr), nī-dīɻ-?vā?à to be afraid; T (gu^3)žu^3?wi$^{3-5}$? to be afraid, du^{3}žu^3?wi$^{3-5}$? to frighten. Plte syll: M *yu; C *^{n}du; T *tu.

63. (*34) M-SM, SE, J nūū to come down; C ndūùvà (po and pt), ī-ndūūvā (pr), nī-ndūūvá (pp) to arrive from above, kūùvà, hīīyā, čīīyā, ndīíyá to arrive descending; T (g)a^{3}wi$^{3-4}$ to go out, to go down. Plte syll: M *nɔ; C *^{n}dɔ, *k^{w}ɔ, *xɔ, *kɔ, *^{n}dɔ (with palatalization of the plte vowel in the last three tenses, and an obscure development in which original intervocalic *-w- was replaced by y in the situation i....a); T *k^{w}ɔ/*kɔ.

64. (*23/*32/*34) C dīī-dààvā (po and pt), ī-dīī-dāāvá (pr), nī-dīī-dāāvá (pp) to clean; T na^{3}ru^{3}wi$^{3-4}$ to erase. Plte syll: C *θa; T has ru- < čV- fused element.

65. C kūùvà, hīīyā, čīīyā, ndīīyā to be hidden (of the sun); T w· i^5 hidden. This set may be the same as 63. Plte syll: T indicates loss of plte syll by strengthening w > w·.

66. (*34) M-SM yāū, M-SE yāū, yāvū, M-J yavi; C hīìvà; T-Ch du^{3}we$^{3-4}$/w· e^{3-4-3}, T-Co yuwi, T-I yuwe century-plant; A tsua (sg), lua (pl) cactus. Plte syll: M, C *ya; T *θa, *ya.

67. (*23) M-SM, SE yāù, M-M yavi hole, M-SM yāù (kāvā) cave; C hīīvā hole, hīīvā (yává) cave; T du^{3}we$^{3-4}$h/w· ehe^3 cliff, cave; A tsue? (sg), lue? (pl). Plte syll: M, C *ya; T *θa.

68. (*24; T *21) M-SM, SE yūù, M-M yuvii; C hīīvā; T-Ch du^{3}we$^{2-1}$/w· e$^{1-2}$ straw mat, T-Co yuwi; A tsue (sg), lue (pl). Plte syll: M, C *yu; T *θu, *yu.

69. (*23, *32; C *11, T *11/*12, M *31) M-SM nū-yá?ū at the market place, yà?ū pay, wages, čà?ū, čá?ū to pay M-SE yà?ū market place, wages, M-J tya?vi to pay; M-M ča?vi to pay; C ?íívà market place, číí?và wages, nā-dīí?vā to pay; T-Ch du^3?we$^{4-3}$ wages, na^{3}ru^3?we$^{3-4}$/na^{3}ru^2?we^{5}h to pay, (gu^3) du^3?we^{2}h/gu^{3}du^2?we^{5}h, gu^{4}du^4?we^4 sell, ži^{3}ru^3?we$^{4-3}$ rich man, catrin, ?we^{3-4-3} market place, T-Co yu?wi, T-I yu?we market place; A tiam ?lua pay, will fight. Plte syll: M *ya (with fusion of prior tV- + ya > ča- or tya-); C *ya (with fusion of prior tV- + ya > čii-; and with fusion of prior dV- + ya > dii-); T *θa, *ya, ru- < čV- fused element.

70. (*22/*24/*42 but probably the latter in that M may here

witness to *41 sandhi variant; M witness suspect because of tī-.) M-SM čà ʔú/tī-yà ʔú, M-SE čà ʔú, M-J tya ʔvi; T ža^{3} ʔwe$^{1-2}$ lice eggs. Plte syll: M *ya (with fusion of prior ti + ya > ča- or tya-); T *ta.

*tɪ̄

71. (*24) M-SM hītɪ̄, M-SE yītɪ̄; C hēētē; T ži^{3}či$^{3-5}$? intestines. Plte syll: M *yi, *xi; C *xi; T *ti.

*kɪ̄

72. M-SM hīkɪ́, M-SE yīkɪ́, M-J čiki; C ʔyūūčē? fist. Plte syll: M *yɔ, *xɔ; C *yɔ.

73. (*33; M-SM *11) M-SM yɪ́kɪ́, M-SE yīkɪ̄; C ʔyūūčì? 'medida de codo,' cubit. Plte syll: M, C *yu.

74. (*22?; T *21?) M-SM yīkɪ̄, M-SE yīkɪ̄ bone, shell, horn; M-M ʔiki bone; T zi^{3}kɪ̄^{2}h shell (of egg), (ču^{3}h) zi^{2}kɪ̄hī$^{5-4}$ peanuts, 'shell-fruit' (tones 2 5-4 by back-formation from 32h), kɪ̄$^{1-2}$ bark. Plte syll: M *yi; T *θi.

75. (*34) M-SM, SE ^{n}dīkɪ̨̄, M-M ʔiki; T kɪ̨$^{3-4-3}$ seeds; A lkɪ̨ rice. Plte syll: M *^{n}dV, *yV.

76. (*22?/*22; C, T *21) M-SM, SE yīkɪ̨̄, M-M ʔiki squash; C yúúkū squash in the phrases y. (yūùnù?) calabacita tierna and y. (ndūùkú) calabacita chompa, yūūkù (yɪ̨̄ɪ̨̄) calabacita chiquita, yūùkù? calabacita yúúkù (há?áí) chilacayota; T da^{3}kɪ̨$^{2-1}$/kɪ̨^{3} squash; A tskɪ̨ (sg), lkɪ̨ (pl) squash. Ult syll: *kɪ̄m/*k^{w}ɪ́. Plte syll: M, C *yɔ; T *θɔ.

*k^{w}ɪ

77. (*22, *43; C, T *21, C, T *13) M-SM, SE yūkū, M-M yuku mountain; C hīīkù hill, nā-hāākō slope, hillside, ʔdáákó a pile, tííkó a little hill, ʔtííkù top, summit; T kɪ̄hī^{3} mountain, da^{3}kɪ̨^{3} slope, hillside, da^{3}kɪ̨$^{2-1}$ a hill of corn, the nose, da^{2} kuhu$^{5-4}$ sty (of the eye). da^{3}kuhu$^{4-3}$ ascent. The latter two T forms may be borrowings from M. Plte syll: M *yu; C *yu, *xa, *θa, *tu; T *θa. There is here a mixture of forms from two PMx nouns: One noun with plte *yu, *tu ('t' declension), and another noun with plte *θa, *xa. ('θ' declension).

78. (*22; C *21) C hííkú river, hīīkō (ʔlɪ́ɪ́) gully; T kɪ̨^{3} river; Plte syll: C *yu/*xi.

79. (*22) M-SM, SE, J ʔikū; C ʔīīkò; T gu^{3}kɪ̄^{3} yesterday.

No plte syll. M and C have obscure ?i and ?ii respectively. T has gu- < gwi^3 day.

80. M-SM ^{n}dǐkī, M-SE tī-kū?ū, M-J ^{n}di-kumi; M-M tiko; C (ndūūtē) ?yāākū; T (kwe^{3}h) kɻ^3 onion. This set involves several phonological problems and is not included in the statements of the preceding sections; it is nevertheless retained here as a residue of peculiar interest in that M-J seems to preserve PMx and PM final *-m before added -i element of obscure origin.

*θī

81. (*24; C *21) M-SM ^{n}dīšǐ, M-ŞE, J ^{n}dīšī cane-whiskey; C nā-dí?ǐ cactus-beer; T di^{3}ci$^{3-5}$?/ci?i^3 cactus-beer. Plte syll: M, T *^{n}di.

82. (*34) M-SM ^{n}dǐšǐ, M-SE, J ^{n}dīšī; T di^{3}ci$^{3-4}$/ci^{3-4-3}; A se (sg), tse (pl) roasting-ear. Plte syll: M, T *^{n}di.

83. (*33?; T *11) M-SM kū-sīǐ (?īní); M-SE kū-sīǐ-nǐ to be content; C (kūùvà) ?dɻ̄ (po and pt), (hííyá) ?dɻ̄ (pr), (ndīīyā) ?dɻ́ to become calm; T dī^3?ɪ^{3}h/dī$^{2-1}$ calm, unruffled.

84. (*33?, *32?/*42, *22?) M-SM kāšɻ̀, hāšɻ́ to press, to chew, k^{w}àšɻ, háši to press, to nail, kīsī, kísī to tremble, to quiver, M-SE k^{w}èšɻ, héšɻ to press, to chew, kīsī, kísī to tremble, to quiver, M-J k^{w}aši to press, to nail, kisi to tremble, to quiver; C ?kāādì, ?īìdì, čīídì, n?díídì to shake something; T (g)a^{3}cï^{3}h to touch, to feel. In this, as in the preceding set, vowel ï in T is obscure. In this set it may indicate that the T form is a borrowing from M. Plte syll: M *ka, *xa, *k^{w}a; C *ka, *xa, *ka, *^{n}da (with vowel palatalization in the last three tenses); T {*ka/*xa}.

*xï

85. (*34) M-SM yūhą̄, M-SE ñūhę̄, M-M yušą; C yāàčè; T da^{3}kɻ$^{3-4}$h/kɻhɻ^3; A tskę dough. Plte syll: M *yam *ñam; C *ña/*ya; T *θa.

*x^{w}ɪ

86. (*24) M-SM kū-^{n}dɻhɻ, M-SE kū-^{n}dɻhɻ, M-J ku-^{n}diči; T ži^{3}gɻ$^{3-5}$ to dawn. Plte syll: M *^{n}di; T *ti.

87. (*22/*34/*43) M-SM, SE kāhɻ, M-J kačɻ warm, damp; T gɻ^5 warm. This is possibly a root related to the preceding. Plte syll: M *ka.

88. C kɻ́?ɻ́; T zi^{3}gï?ɪ^3 chicle. Possibly no plte syll. T

has zi^{3}- that which (which ultimately harks back to PMx *θi but may be a T fusion).

*^{n}dī (varying with *nī in some sets)

89. M-SM, SE nī̂ī all of, complete, ^{n}dī̂ī in every place, completely, ^{n}dī ?ī̂ all finished, M-J nini all of, complete, ^{n}di ?i all, finished; C ndūū all; T nī^{5}? all, ni^{4}nī^{4} segregated, apart from others. (Probably there were two roots, *nī and *^{n}dī ?. Notice that forms only with n- in M do not have ?. A third PMx form *^{n}dī may have developed by contamination; this form may lie back of the C cognate as well as the M ^{n}dī̂ī). Plte syll: reduplication in M-J and T.

90. (*33) M-SM kā ?^{n}dì, ká ?^{n}dì, M-SE kā ?^{n}dì, ká ?^{n}dì, M-J ka ?^{n}di; C kūùnì, hīīnī, čīīnī, nīīnī; T ga^{3}nī^{3} to explode. Plte syll: M *ka; C *k^{w}a, *xa/*xi, *ka, *^{n}da (with vowel palatalization in the last two or three tenses).

91. C nā- ?nɻ̄ɻ́nɻ́, ī-nā- ?nɻ̄ɻ́nɻ́, nā- ?ɻ̄ɻ̀nɻ̀, nī-nā- ?nɻ̄ɻ́nɻ́ to open; T na^{3} ?nī^{2}h to open, na^{2} ?nīhī$^{5-4}$, ni^{2} ?nīhī$^{5-4}$ open. Assume *?^{n}d- or *?n-. Plte syll: C *nam; T *na, *ni.

92. C ?nɻ̄ɻ̄-(ntīīyū̄), ī- ?nɻ̄ɻ̄-(ntīīyū̄), ?nɻ̄ɻ̀-(ntīīyū̄), nī- ?nɻ̄ɻ̄-(ntīīyū̄); T (g)a^{3} ?nī$^{2-1}$ (zǫ$^{3-4-3}$) to order, to command. Plte syll: T {*ka}.

*^{n}g^{w}ī

93. (*33) M-SM, SE kīvì, M-J kivi day, M-SM ^{n}dúú by day, ?ā-^{n}dívǐ the heavens, M-SE ^{n}dūú by day, ?ā-^{n}dīvǐ the heavens, M-J ^{n}duvi by day, ?a-^{n}divi the heavens; C hūūvē the day, nā-hūūvē the heavens; T gwi^{3} day, sun, (n· e$^{3-4}$) ra^{3}ngwi^{3} (place-name) 'agua del sol,' žu^{3}gwi^{3} name of; A šue (sg), nkue (pl) day, light, fiesta, name. Plte syll: M *kɔ, *^{n}dɔ; C *xɔ; T *tɔ and ra- < čV- element.

94. (*43/*24/*42) M-SM ñà-yī̂vī̂ people, ñù-yívī̂ world, M-SE ñà-yūū people, ñā-yī̂vǐ world, M-J ñivi people, ñu-nivi world; T-Ch gwi^{3-5-4-} people, žu^{3}mi^{3}gwi$^{5-3}$ world, T-Co yuwi people, T-I ngwi people; A (tsham) nangue world. Plte syll: M, T *yɔ.

*mǐ

95. (*22/*33) M-SM čɻ̀ ?ɻ́, tī-ñì ?ǐ, M-SE čɻ̀ ?ɻ́, M-J ti-ñiɻ ?iɻ; C sā- ?ī̀ ?mà; T-Ch ža^{3} ?ą^{3}, T-I žu ?ma; A ts ?ąiɻ (sg), nts ?ąiɻ (pl) or katsęiɻ (sg), kants ?ęiɻ (pl) skunk. Plte syll: M *ñu; C *ñu/*yu; T *tu.

96. (*42, *33/*23/*24) M-SM, SE sɨ̀ʔɨ̄ foot, M-SE sɨ̄ ʔɨ̀ post, leg of table. M-J sɨ ʔɨ foot; C dɨ̱ʔmą̄ leg; T da^{3}ʔmą^{5} leg; A šʔe (sg), nkʔe (pl). Plte syll: M, C *θu; T *^{n}da.

*ñĩ/θĩ

97. (*23; M *11) M-SM ñĩñĩ, M-SE ñíñí; C yɨ̱ɨ̱; T a^{3}tą$^{4-3}$ hail. No plte syll. M reduplicates. T adds a- or possibly some PT *ya- element.

98. (*43; C *13) M-SM, SE ñĩñĩ, M-J ñiñi, M-M ñii; C yɨ̱ɨ̱; T zi^{3}-tą$^{3-5}$ʔ/tąʔą^{3}; A tsiam (sg), niam (pl) ear of corn. No plte syll. M dialects reduplicate, except M-Ɱ.

99. (*23) M-SM, J ñĩ̀, M-SE ñĩì; T dą$^{3-4}$/yą$^{3-4-3}$; A tshą salt (a possible C cognate: hīìmà).

100. (*22; T *21) M-SM, J sà-ñĩ̄, M-SE sàñĩ̄; T dą^{2}/yą^{2} corn cob. The following C form may be cognate but seems difficult to relate: ī-nɨ̱ɨ̱ roasting ear. No plte syll: M adds sa- with passage to CVCV in M-J.

*wĩ

101. (*34) M-SM, SE tĩ̄ʔvĩ̄ to suck, to suck blood, to practice witchcraft, M-J tiʔvi; C tiīʔvī, ī-tīīʔvī, tīìʔvì, nī-tīīʔvī to suck; T zdu^{3}ʔwaha$^{4-3}$ witchcraft. Plte syll: M, C *tu; PT *ždu.

102. M-SM stĩ́vĩ́, M-SE stĩ́vĩ̄, M-J sa-tivi to err, to destroy; C dā-tùùvī, ī-dā-tùùvī, dā-tūūví, nī-dā-tūūví to destroy. Plte syll: M, C *ti.

103. (*33/*23/*24) M-SM tĩ̄vĩ̀, M-SE tĩ̄vĩ̄, M-J tivi to play a wind instrument, blow; C tīīvī, ī-tīīvī, tīīvì, nī-tīīvī to blow. Plte syll: M, C *tu.

*ʔɨ

104. M-SM, SE ʔɨ̱ɨ̱̀, M-J ʔɨɨ; C nɨ̱ɨ̱; T-Ch ʔɨ^{4}, T-Co ʔu, T-I n·ɨ; A nhę nine.

*ta

105. (*22; T *21) M-SM, SE, J kātā, hítā, M-M kata, hita; C kāātā, hīītā, čīītà, ndīītā; T (g)a^{3}ča$^{2-1}$, ga^{4}ča^{4}; A -ta to sing. Plte syll: M *ka; C *ka, *xi, *ka, *^{n}da (with vowel palatalization in the last two tenses); T {*ka}.

106. (*24; T *21) M-SM, SE stāà, M-J, M šita; T da^{3}ča$^{2-1}$/ča^{3} tortilla (tone 3 of latter form is obscure). Plte syll: M, T *θa.

107. (*24; C, T *21) M-SM, SE yātà, M-J čate, back; C táátá tile; T ži^{3}ča$^{2-1}$ back of, roof of, ž. (we?e^{3}) roof of house; ži^{3} ča$^{4-5}$ (ni^{4}tu$^{4-3}$) hunch-backed (tones 4-5 of latter form are obscure); A kantya? back. The C meaning may be by metonomy from such a phrase as 'roof of house.' Plte syll: M *ya, *xa; C *ta; T {*ta}.

108. (*42; T *41) M-SM yùčā, M-SE yùtē river; T-Ch ča$^{1-2}$ valley, canyon, T-Co ča?a river. Plte syll: M *yam/*yɔ/*yu.

109. M-SM hīčá, M-SE hítế wide; C dā-?k^{w}ìtā (po and pt), ɬ-dā-?k^{w}ìtā (pr), nī-dī-?k^{w}ītá (pp) to grow; T ga^{5}ča?a$^{5-3}$ wide. Plte syll: M *xi; C *k^{w}i; T has ga-.

110. (*22; C, T *21) M-SM yūnū tree, M-SE yūNū tree, M-J yutų tree trunk, M-M tutu firewood; C nę́?ę́ firewood, yę́?ę́ stick; T ži^{3}čų$^{2-1}$/čų^{3} stick, wood, firewood, tree; A ts?am (sg), n?am (pl) stick, wood. Ult syll: M *n-, *tn-; C *n-, *y-; T *t-. Plte syll: M *yɔ, *tɔ; T {*tɔ}.

111. (*24; T *21) M-SM hānù box, hīnù oven, M-SE yēNù box, (yāù) ?ínù barbecue-pit, M-J čatų box, čitų oven; T ži^{3}čų$^{2-1}$/ čų$^{1-2}$ box, barbecue-pit, gu^{3}čų$^{1-2}$ oven, kiln; A ntam? oven. Ult syll: (cf. set 110). Plte syll: M-SM, J *xa, *xi; M-SE *ya, *yi; T *xi and gu- (ultimately < *k^{w}i/*k^{w}a but probably a T fusion).

*ka

112. (*24/*42/*43; probably the latter in view of T loss of *? from *?k) C (kúúvé) ?yāàkà to be slobbery, to slobber; T (g)a^{3} ka^{5} to leak. Plte syll: C *ya; T {*ka}.

113. (*22) M-SM sākā, sákā to divide up, to distribute, sáká (núū) to mix, M-SE, J sākā (nu^{3}ū) to mix; C kà-?kāākā, ī-?kāākā, čī-?kààkā, nī-?kāākā to divide up, ?kāākā, ?ííká, č?īìkà, n?dííká (to cut firewood); T (g)a^{3}ka^{3} to shave, na^{3}ka^{3} to sharpen (something metallic), (n· e$^{3-5}$)ka^{3} scissors. Plte syll: M has fused sa- to make, to do (ultimately from PMx *θa but probably a M fusion); C *ka (throughout one verb), *ka, *xa/*xi, *ka, *^{n}da (with vowel palatalization in the last two or three tense forms); T {*ka}.

114. (*33/*23; C *11) M-SM, SE, J kūkà; C káákà comb. Plte syll: M {*k^{w}a}; C *ka.

115. (*22/*34; C *21/*14) M-SM, SE ^{n}dīkā; C tyáákú banana. No plte syll. M has ^{n}di- and C has tya- of uncertain origin.

116. (*34; C *14) M-SM k^{w}ākā, hákā to take away, ^{n}ǰākā to take along, M-SE k^{w}ēkā, hékā to take away, ^{n}dēkā to take along, M-J ^{n}daka to take along; C kā-?káákā, ī-?káákā, čī-?kāàkà, nī-?káákā to operate (something). ndāàkà (po and pt), ī-ndààkà (pr), nī-ndáákā (pp) to get, to find, nā-ndààkà (po and pt), ī-nā-ndààkà (pr) nī-nā-ndāākā to find; T $ni^{3}ka^{3-4}h$ to have, $na^{3}ka^{3-4}h$ to gather up, $ža^{3}ka^{3-4}h$ to take, get, fetch, $a^{3}ni^{3}ka^{3-4}h$ to revolve, $na^{3}ni^{3}ka^{3-4}h$ to turn about, to return; A ntkam to turn by itself, rkam to revolve. Plte syll: M *k^{w}a, *xa (with fused ^{n}dV- + ya > ^{n}ǰa, ^{n}de, ^{n}da); C *ka, *^{n}da; T *^{n}da, {*ta} and ni- (T 'stative' prefix).

117. (*23) M-SM ^{n}ǰākà, M-SE ^{n}dēkà, M-J ^{n}daka, M-M ^{n}dyaka; T $na^{3}kaha^{4-3}$; A nda kwe glue. (The A phrase which means 'sticky water' may involve a popular etymology.) Plte syll: M has fusion of ^{n}dV- + *ya > ^{n}ǰa, ^{n}de, ^{n}da, ^{n}dya; T *^{n}da.

118. (*3ʒ/*23; C *11) M-SM, SE tākà; C ?dáákà; T zi^{3}-ga^{5} ka^{5}?; A katkya (sg), kantkya (pl) nest. Plte syll: M *ta; C *θa; T ga-.

119. (*23) M-SM kākà, M-SE kākā quicklime; C kāākā quicklime, kūùkù, hīǐčǐ, čīǐčǐ, ndīǐčǐ to burn, kāà-(?yą?ą), ī-kī-(?y.), čī-kī-(?y.), nǐ-kǐ-(?y.) to burn something; T $ga^{3}ka^{3-4}$ to get burned. Plte syll: M *ka; C *ka; *k^{w}a, *xa/*xi, *ka, *^{n}da (with vowel palatalization in the last two or three tenses; with late palatalization of vowel in the abbreviated form of the verb); T {*ka}.

120. (*23/*32/*34) M-SM tī̄-kàkā́, M-J ti-kaka; T $ža^{3}ka^{4-3}$ the crow. Possibly no plte syll: M has a reduplicated form with prior tī-; T has ža- (ultimately from some PMx *ta element.)

121. (*24; C *21) C yáákā́ pine wood, ǐ-yáákā́? pine tree, ī-nčáákā́? ladder, hāākā roof-pole, n?dáákā́, ī-n?dáákā́, n?dāàkà, nī-n?dáákā́ sweep; T $ka?a^{3}$ pine wood, torch, candle, $re^{3}ka?a^{4-3}$ stick, $re^{3}ke?e^{4-3}$ splinter, $na^{3}ka^{3-5}$? to sweep; A ska (sg), lka (pl) candle, kaa, tkaa, lkaa to sweep. Plte syll: C *ya, *xa, *^{n}da (also with prior C i-; and with *^{n}dV- + *ya > nča accompanied by prior i-); T *^{n}da and re- < $čų^{3}$ wood (note 'r' effect on vowel of the ultima in one form.)

122. M-SM tī-yáká, čáká, M-SE čàkā́, M-J, M tyaka, C ?yāàkà; T $žu^{3}kwaha^{3}$; A katska (sg), kalka (pl) fish. Plte syll: M *ya (with fusion of tī animal + ya > ča and tya); C *ya; T žu- animal. The fused elements in both M and T hark back ultimately to PMx *tu? animal, but the fusions seem to be post-PMx.

123. (*22; C, T *21) M-SM, SE kākā, híkā, M-J kaka, čika, M-M kaka, šika to walk; C ku-čìǐkà, ī-čìǐkà, kē-čìǐkà, nī-čìǐkā to walk, take a walk, káákā, híǐkā, čīǐkà, ndíǐkā to walk; T (g)a^{3} če$^{2-1}$, ga^{4}če^{4} to walk, čehe^{3} path; A kaa to walk. Plte syll: M *ka, *xi; C *ki (throughout first verb), *ka, *xi, *ki, *^{n}da (with vowel palatalization in the last tense); T {*ka}.

124. (*32/*42) M-SM, SE J kàā iron, bell; C kūù bell, kūū-tʃ̬ī ax; T ga^{3}ga?a^{3} metal, bell, ga^{3}? hour of day, du^{3}kwa^{2} ga?a^{3} jail, žu^{3}kwa$^{2-1}$ ga$^{1-2}$ rattle-snake, zi^{3}-ka$^{3-4}$h rattle of (rattle-snake). No plte syll. T reduplicates.

125. M-SM, SE -gà, M-J -ka; C kā; T ga^{5}? more.

126. (*24; T *21) M-SM kākà, hīkᵩ́, M-SE kākᵩ̀, híkᵩ̀, M-J ^{n}daka, čika, M-M ^{n}daka to ask; C kāākā, hīǐkā, čīǐkà, ndíǐkā to ask; T (g)a^{3}čᵩ$^{2-1}$ to ask for; A kᵩ, tkᵩ, lkᵩ, tᵩ to ask a loan. A further T form offers a possible cognate in which the peculiar situation leading to the *k > č was not involved; but the vowel reflex is difficult: ži^{3}kᵩ$^{2-1}$ a loan. Plte syll: M *ka, *xi, *^{n}da; C *ka, *xi, *ka, *^{n}da (with vowel palatalization in the last two tense forms.)

*k^{w}a

127. (*22?) M-SM, SE lāk^{w}ā, M-J ^{n}dak^{w}a, M-M dak^{w}a pus; C yāāk^{w}ā? pus; T la^{3}kwe^{3}h mucus, kwe^{3}h pus, (zi^{3}u$^{3-4}$) da^{3}kwe^{2}h vulva. Plte syll: M *la, *^{n}da; C *ya; T *la, *θa.

128. (*23) M-SM, SE yūkù bush, plant, shrub; C kūū-(dī-yúú ?nᵩ?) lanita de agua (algae); T kwehe^{3} edible herbs; A tskwa (sg), lkwa (pl) lanita de agua. No plte syll: M fuses yu- tree, wood.

129. (*23; C *11) M-SM hīkà, M-SE hīkā thorax; C tíǐk^{w}à; thorax; T ži^{3}-ru^{4}kwa^{4} rib. Possibly no plte syll. M has hi- which could hark back to PMx *xi-. C has tii- which could hark back to PMx *tu. T has ru- < ču^{3}h oval-shaped.

130. (*42; T *41) M-SM, SE tǐkā, M-J tika; C tīǐk^{w}à; T ži^{3} ri^{3}ki$^{1-2}$ grasshopper. Plte syll: M, C *tu. T ri- < čV- fused element. (Note 'r' effect on vowel of the ultima and on the fused žu^{3}- animal prior syllable.)

131. C ?k^{w}āā, ?āā, ?kāā, n?dāā; T wa^{3}?a$^{2-3}$/ga^{3}?a$^{2-3}$ to spin. Proto monosyllabic verb of *CV? type is reshaped in C to ?CVV and in T to CV?V. Ult syll: C *k^{w}-, *w-, *k-, *^{n}d- (but with PC *?waa > ?aa in accordance with general elimination of

w- forms from C verb paradigms). T *w-, *k-.

132. (*24; T *21) M-SM, SE yūkṳ̀; T du^{3}kwą$^{1-2}$ row, furrow. Plte syll: M *yu; T *θu.

133. (*23) M-SM k^{w}ą̄?ą̀, hą́?ą̀, M-SE k^{w}ą̄?ą̀, hę́?ę̀, M-J k^{w}ą?ą, M-M k^{w}ą?ą, kṳ?ṳ; C ką̄?ą̀, hę̄?ę̄, čę̄?ę̄, nę́?ę̄ (and k^{w}ę̄?ę̀ you went); T wą^{3}?ą$^{3-4}$h/gą^{3}?ą$^{3-4}$h; A -ha, -tha, -wha, nkha to go. (The A forms may be more immediately cognate with the T verb wa^{3}h to be in motion; but all these forms may belong to a PMx *a/*am paradigm). Proto monosyllabic verb of CV?V form. M *k-, (x-); C *k^{w}-, (x-), *k-, *n- (with substitution of x- for original *w- in M and C; and with vowel palatalization in C); T *w-, *k-.

134. (*24; T *21) M-SM ką̄ą̀, ką́ą̀, M-SE ką̄ą̄, ką́ą̄; C k^{w}ą̄ą̄ ?ą̄ą̄, ?ką̄ą̀, ?nę́ę́ to pierce, to make a hole in (something); T wą$^{2-1}$/gą$^{2-1}$ to dig. Proto monosyllabic verb of *CV? form. M *k-; C *k^{w}-, (x-), *k-, *n- (with substitution of x- for original *w-); T *w-, *k-.

*θa

135. (*34; C *14) M-SM t̄ī-sāà, M-SE sāā, M-J saa; C ?yáádá; T ža^{3}taha$^{4-3}$; A kasa (sg), kantsa (pl) bird. Plte syll: M adds t̄ī in M-SM; C *ya; T *ta.

136. (*33?; M *11) M-SM ?ísá, M-SE ?īsá, M-M ?isa; T a^{3}ta^{3}h the day after tomorrow. Plte syll: M, T *ya.

137. (*34) M-SM (sè?ē) kāsā, M-SE (sè?ē) kàsá; C dāādā; T (da^{3}?ni$^{2-1}$) zi^{3}ga^{3}ta$^{3-4}$h son-in-law. Plte syll: M *ka; C reduplicates; T {*ka}.

138. (*22?/*33?) M-SM ^{n}dāsā how; ^{n}dū-sáá and then, M-SE ^{n}dēsè how; T da^{3}h thus, dą^{3}h a certain. Possibly no plte syll. M forms have ^{n}da- and ^{n}du-.

*xa

139. M-SM háá, M-SE hēé, M-J čaa new; C (nā-dīī-) hāī to moult (of fowl); T na^{5}ka$^{5-3}$ new. No plte syll. T adds na-.

140. (*23) M-SM ^{n}dīhą̀, M-SE ^{n}dīhę̀, M-J ^{n}dičą, M-M ^{n}dišąą; C ndāākū?; T da^{3}ką$^{3-4}$h/ką^{3}h; A tskam (sg), lkam (pl) sandal. Ult syll: *xam/*x^{w}a. Plte syll: M has ^{n}di-; C *^{n}da; T *θa.

141. (*24; T *21) M-SM hā?à, M-SE hē?è, M-J ča?a; C kā?ā; T ži^{3}?i^{2} foot (the T form has been displaced in many

contexts by a newer form da^{3}ko$^{2-1}$ foot, of obscure origin). Monosyllabic root of *CV?V type (possibly verbal in origin; cf. 133). M *x-; C *k-; T *x-.

*x^{w}a

142. (*23; M, C *11) M-SM yák^{w}á, M-SE yàk^{w}á; C ?kwéì crooked; T du^{3}gwa$^{3-4}$? to turn downwards, to twist downwards, du^{3}gwą^{3}?ąhą$^{4-3}$ a forked stick (probably a PT nasalization rather than PMx *-m), la^{3}kwą^{3} lame (by back-formation from the former, cf. zu^{3}gwe^{3}?ehe$^{4-3}$ mattery eyes < kwe^{3}h pus). The diphthongized C reflex raises a phonological problem. Plte syll: M *ya; T *θa, *la.

143. (*33/*23; T *11) M-SM, SE, J kū-vāà to make an uproar, M-SM, SE vāà noisy; C (kūūvē) váá to make noise, čī-?āākū a sound, k^{w}āākū, hāākū, čāākū, ndāākū to weep; T (g)a^{3}gwa^{2}h to scream, to bellow, to cackle. T du^{3}gwe?e^{3} to weep may possibly fit in here as well. Plte syll: M *k^{w}a; C *xa (> ?a by metathesis of *? of medial *?k cluster). *k^{w}a, *xa, *ka, *^{n}da (with analogical reshaping of *ka > ča); T {*ka}.

*^{n}da

144. (*34) M-SM ^{n}dūčā water, to dissolve, M-SE ^{n}dūtē, M-J ^{n}duta; C nǭǫ̨nę̄ /nǭǫ̨nį̄ water, (tīīvī) nę̄ę̄ to sprinkle to spatter (so in several phrases); T da^{3}ne$^{3-4}$/n·e^{3-4-3} water, du^{3}gwa^{3}ne$^{3-4}$ melt, T-Co n·a water; A nda liquid, water. Plte syll: M, C, T *^{n}dɔ; T {*kɔ}.

145. (*33) M-SM kū-^{n}ǰāà, ká-^{n}ǰāà, M-SE kō-^{n}dēē, ^{n}déè, M-J ku^{n}da to be (somewhere), to be seated; C ?k^{w}īīndī, vāā, č?īīndī, ?nīīndī to be seated, ?k^{w}īīndì, ?īīndì, č?iìndì, ?nīīndì to sit down, kò-nę̀ę̀, ī-nę̄ę̄, kē-nę̄ę̄, nī-nę́ę́ to stay (somewhere); T (ga^{3})n·e^{3} to be (somewhere), reside, sit. No plte syll: M has ka- and ku- (from *ka and *k^{w}a auxiliary verb). C has fused auxiliary verb, giving forms ?kwii-, ?ii-, č?ii- and ?nii- in one verb but preserves evidence of old present *w- in the other verb); T {*ka}.

146. (*24; C *21) M-SM kā?^{n}ǰà, há?^{n}ǰà, M-SE kā?^{n}dē, hé?^{n}dē, M-J ka?^{n}da to cut; C k^{w}ę́ę̀?, ?ę́ę̀?, č?ę́ę̀?, ?nę́ę̀? to break; T-Ch (g)a^{3}?ne$^{3-5}$?, T-I ga?ni? to cut; A ?nę to dig (in wood, earth, rock). Ult syll: C *k^{w}-, *x-, *k-, *n-. Plte syll: M *ka, *xa; T {*ka}. Probably either the M or C treatment (inflection of ult syll vs addition of plte) is PMx and the other is a development in the particular language.

147. M-SM, SE stáā, M-J šita to pull; C kū-n?dāà, ī-n?dāà, čī-n?dāà, nī-n?dāà to pull, to guide. Cf. M-SM skáā, M-SE skáá to stretch (something); C kūù, hīǐ, čīǐ, ndíí to stretch oneself; T $nu^{3}kwa^{2-3}$ to stretch (something), $n\cdot ɪ^{3}h\ nu^{2}kwa^{3}$ sling-shot. Ult syll: M *t-, *k-; C *^{n}d-; *k^{w}-, *x-, *k-, *^{n}d- (with usual vowel palatalization); T *k^{w}-. Plte syll: M *θa; T *^{n}da.

148. (*23; C *11) M-SM ^{n}dāà (yáū), M-SE $t\bar{ɪ}^{n}$dà (yáū), M-J ^{n}daa (yavi) (second constituent means century-plant); C ndáá; T $da^{3}?/ya?a^{3}$ fiber of the century-plant. Ult syll: M, C *^{n}da-; T *y-, *^{n}d-.

149. (*34) M-SM, SE, J ^{n}dā?ā hand; C kū-tā?à to sieze, tā?ā hand; T $(gi^{3})da^{3}?a^{3-4}$ to sieze, $ru^{3}da?a^{4-3}$ mano de metate (stone rolling pin used in grinding corn), $ra^{3}?a^{3}$ hand. This set and the preceding may be related in that *^{n}da?a may be a PMx expansion of ^{n}da?; M ^{n}dā?ā > ^{n}dā in some morpheme sequences. Ult syll: M *^{n}d-; C *t-; T *^{n}d-, T has r-, and ru^{3}- both < $ču^{3}h$ oval-shaped.

tna/^{n}da (latter in C)

150. (*23) M-SM tą?ą to transpire, stą?ą to bother, to pester, hā-tą?ą ?ɪnɪ to be pleased with, M-SE Ną?ą to transpire, stą?ą to bother, to pester, hé-Ną?ą-ní to be pleased with; C nę?ę to like; T $(gi^{3})rą^{3-4}?$ to fare (well or ill), $drą^{3-4}?$ $yɥ^{4}$ $?ɥ^{3-4}h$ to bother, to pester $(g)a^{3}rą^{3-4}?$ $ru^{3}wa^{2-3}$ to be pleased with. Ult syll: M *tn- (with s- from fused sa- to make < PMx *θa); C *^{n}d-; T *tn- (with fused d- element, possibly < *θa also).

151. C dà-n?dé?ē (po and pt), ī-dà-n?dé?ē (pr) nī-dā-n?dé ?ē (pp) to chew, to dance; T $(gi^{3})rą^{2}?ą^{5}h$ to dance. An alternative etymology would be to list the above C cognate with M-SM š^{n}dí?ī pulverize, grind—in which case the T form would not be cognate because of its vowel reflex. Ult syll: C, *^{n}d; T *tn.

*^{n}ga

152. M-SM ^{n}dīhā, M-SE ^{n}dīhē, M-J ^{n}diča in sincerity; T $ža^{5}nga^{5}?$ truly. Probably no plte syll. M has ^{n}di-; T has ža-.

153. (*43/*24/*42) M-SM kē-há?á, M-SE kē-héé, M-J keča?a; C kū-nkõ?õ/kū-nkā?ā, ī-k., čī-k., nī-k.; T $ga^{3}ži^{3}?i^{5}$ to begin. Plte syll: M *ka; C *k^{w}a; T {*ka}.

*$^{n}g^{w}$a

154. (*43; C, T *13) M-SM ^{n}dāvā, ^{n}dávā, to jump, ^{n}dūā

arrow, dart, M-SE, J ⁿdāvā, ⁿdávā to jump, ⁿdūvā arrow, dart; C káávà, hāà, kāà, ndáà to jump; ī-yāàvà arrow, dart; T da^{3} ngwe$^{3-4}$h to spring away, to jump away, (g)w·e^{2}h to jump. Ult syll: M, C, T *ⁿg^{w}- but C (kaa)v-, h-, k, ⁿd-. Plte syll: M *ⁿda, *ⁿdɔ; C *ka, *ya (with prior C i-); T *θa.

155. M-SM, SE kǭù, M-J, M kumi four; C kǭù? four, kǭǭ-hāākū eighty; T gą^{5}?ą^{3}h four, ngwą^{4}?ą^{3}h four more. M-J, M retains PMx and PM final *-m on addition of -i (by analogy with ?uvi two and ?uni three).

156. (*22?/*33?) C čī-kǭ?ǭ; T žu^{3}gwą^{3}?ą^{3}h grandmother. Cf. M-SM (nānáˊ) ffúù and nānáˊ ffáˊ?nū grandmother—with the first constituent consisting of a Nahuatl or Mayan loan corresponding to a similar loan-word in T viz. na^{3}na^{3}h elderly lady, honorable lady. The second constituent of the first M-SM phrase, i.e., ffúù may be an ff- initial variant of the root here presented. The second M-SM phrase—which has spread through the other M dialects—has as second constituent a form listed under 276.

*ma

157. (*24) M-SM, SE ffū?mà, M-J yu?ma; C ?yą̄ą̄?mē smoke; T yo^{3}?o$^{5-3}$ the gummy deposit made by smoke from a wood fire; A ntiam smoke. Plte syll: M, C, T *yam.

158. (*33) M-SM hà-nǐ-čā?mà, M-SE (hēè) nī-čímā something flattened; C dįį̄-sīī?máˊ, ī-dįį̄-sīī?máˊ, dįį̄-sīì?mā, nī-dįį̄-sīī?máˊ to flatten; T (gi^{3})na^{3}?mą^{3} to cave in (of earth in a clay pit). No plte syll. M has fusion of some tV- element with *ya > ča or či. Origin of C sii- is obscure. T adds na-.

159. (*22?; C, T *21) M-SM, SE, J, M ffǭ?ǭ land, soil; C yą̄?ą̀?; T do^{3}?o$^{2-1}$/yo^{3}?o$^{1-2}$; A ts?o soil. Plte syll: M *ffam; C *ffam/*yam; T *θam, *ffam/*yam.

160. (*33/*23/*24) M-SM ką̄?ą̀, ką́?ą̀, M-SE ką̄?ą̀, ką́?ą́, M-J, M ką?ą to talk; C ką̄ą̄?mą̄, hą?ą̄, ką̄?ą̄, nǐ-nką̄?ą̄ to say: A tma talk over, ?mą to teach. Plte syll: M *ka; C *k^{w}a, *xa, *ka, and *ka with prior *nim-. The nasalization in the penultimate syllables of the various M and C forms is resultant on reduction to CV?V pattern at one or more spots in the verb paradigm of each language.

161. M-SM, J, M tą́?ą̄, M-SE Ną́?ą̄ comrade, of the same class, M-SM (?ūù) tą́?ą̄ a pair: C ną̄?ą̀ a pair; T a^{4}mą$^{3-4}$? a couple of (only in the phrase a^{3}?ngo^{2} a^{4}mą$^{3-4}$? ča^{3} a couple

more tortillas), nu^{5}gwą^{5}? together with (*numą? > *nuwą? > nugwą?), yą^{3}?ą$^{5-3}$ twins; A š?ia (sg). ts?ą (pl) companion, friend. Plte syll: M *tna; C *na; T *ya (with loss of *y in first T form, and with spread of nasalization to plte syll on reduction to disyllabic CV?V in the third form. The second T form is probably by fusion of some PT *nu- element.

162. (*33; M *11) M-SM, SE, J máá that one; C mą̃ą̃ oneself; T mą^{3} ?ą^{3} oneself. T has added a syllable after the final *-?.

*na

163. (*23) M-SM (kūkā) nūù, to be ashamed, (tūkā) nūù shame, M-SE kū-kānū, kú-kānū to be ashamed, M-J (koo tuka) nuu to be ashamed; C (kūūvē kwì-) náā to be ashamed; T (zi^{3}-) na^{4}?aha$^{4-3}$ shame of.

164. M-SM nāā (?ìní), M-SE nāā (-ní), M-J naa (?ini) to forget, M-SM, SE, J nāā to get lost; C (kūūvē) náā to forget.

165. (*33; C *11) M-SM ?ìnà, tī-?ìnà, M-SE, J ?ìnā dog; C ?yáánà dog, ?yų́ų́nà fox; T žu^{3}ne^{3} fox. Plte syll: M *yu; C *yu and ya-; T *tu.

166. (*23) M-SM, SE, J nūù face, towards, in front of, place where, time when; C nā-ną̃ą̃ in front of, k^{w}ā-vēną̃ą̃ place before, k^{w}ą̃ą̃ place, time (the latter, if really cognate, possibly represents a fusion of this root with some preceding element); T yą$^{3-4}$/ ri^{3}ą$^{3-4}$ face of, surface of, in front of, place where, time when, (g)a^{3}di^{3}ą$^{3-4}$ to precede; A nam (sg), and ndæ (pl) face, edge. No plte syll. Various fused elements in C and T. T ri- < ču^{3}h oval-shaped; T di- with prior a-.

167. (*22?) M-SM, SE, M ñūnū, M-J yunu; C yāānà; T n· ą^{3}h net-work bag (Sp. red), ži^{3}ną^{2}h crop (of a bird). Plte syll: M *ñam; C*ña/*ya; T {*ta}.

168. (*32; M *31) M-SM nū-mà?ná, M-SE mà?ná, M-J ñuma?na; T n·ehe^{3} drowsiness, sleep. Plte syll: M has some sort of ma- penultimate element that is presumably a post-PMx fusion in that there is no clear evidence for PMx prevocalic *m- in plte syll. T strengthening of n > n· indicates however, loss of some plte element.

*ña (*ñ-, *θ- in most sets)

169. (*34; C *14) M-SM, SE ñēñū; C (ndūūtē) yą̃ą̃; T a^{3}tą$^{4-3}$

blackberries. Ult syll: M *ñ-; C *ñ-/*y-; T *θ-. Plte syll: M *ña; T *ña/*ya.

170. (*33/*23/*24; C *11, T *21) M-SM, J ñūù, M-SE ñūū; C yą́ą̀; T ži^{3}ą^{2}; A tsham (sg), nham (pl) village. The T form is possessed: the unpossessed form, žu^{3}mą?ą$^{4-3}$ village, is apparently from a root for which I at present have no etymology. No plte syll. T has ži^{3}- (which ultimately harks back to some PMx *xi- or *tV- element).

171. (*34; C *14) M-SM, SE, J, M ?īñū; C yą́ą́; T tąhą^{3} A tsiam, niam thorn. Ult syll: M *ñ-; C *ñ-/*y-; T *θ-. No plte syll. M adds ?i- element.

172. (*23; C *11) M-SM, SE, J ñū?ù; C yą́?ą̀ fire, (kāà-) ?yą́?ą̀ to burn (something) (for the first constituent see 118), (?kūūnī) yą́ą̀ to be born, i.e., 'see light,' ?yą́?ą̀ the sun; T dą^{3} ?ą$^{3-4}$/yą^{3}?ą$^{4-3}$ fire, light, gu^{3}ni^{3}?yąhą$^{4-3}$ day-light; A tšam (sg), nam (pl) fire. Ult syll: M *ñ-; C *ñ-/*y-; T *ñ-/*y-, *θ-. No plte syll. T adds ni^{3}- with prior gu^{3}-. Notice the parallelism of C and T forms with ?y-.

173. M-SM, SE, J, M ?īñù; C hą̄ą̄; T wa^{5}ta^{5}? six, ya^{3}tą^{4}?/wa^{3}tą^{4}? six more; A ñam six. Ult syll: M *ñ-; C *x-; T *θ-. Plte syll: M *wa/*ya; T *wa, *ya.

174. (*24) M-SM tī-?īñù, M-SE tīñū, M-J ?iñu; T a^{3}tą?ą$^{4-3}$: A tsam? foam, suds. Ult syll: M *ñ-; T *θ-. Plte syll: M, T *ya.

175. (*22) M-SM, SE ñūñū honey-bee; T žu^{3}tą^{3} honey-bee, honey-comb; A katsiam?, kaniam? bee. Ult syll: M *ñ-; T *θ-. Probably no plte syll. M reduplicates. T adds žu^{3}- animal.

176. (*23; C, T *11) M-SM k^{w}ī?ą̀, hí?ą̀, M-SE hī?ñā, hí?ñā to bark (of a dog), M-J ^{n}da?yu to yell; C ?yą́ą́yą̀? coyote, ?yą́ą́yà (k^{w}á?ā?) mountain lion; T (gi^{3})ži^{3}?yą$^{3-4}$h and (gi^{3})ži^{2}?yą^{5}h to bark; ža^{3}?yą^{3}h coyote. (Other possible C cognates are nā̄?ą̀ (nīīnō) to breathe, ?ē?ę̀ (nūū) to fan with a fan). Plte syll: M *k^{w}i, *xi (the former may be an analogical development in M-SM); M-J *^{n}da; C *ya, *yam (may be PC stem reduplications); T *xi (with prior gi^{3}-), *ta.

177. (*23; M *11) M-SM hí-ñą́?ą́, M-SE yí-ñą́?ą́ honored, respected; T (gi^{3})na^{3}yą^{3}?ą$^{3-4}$h to respect. (cf. 193, 173) Plte syll: M-SM *xi, M-SE *yi; T na^{3}- with prior gi^{3}-.

178. (*42; C, T *41) M-SM, SE, J kùñū; C yúútà; T n·e^{3-5-4} meat. Ult syll: M *ñ-; C *t; T *n-. Plte syll: M *ku; C *yu; T loss of plte indicated by strengthening of n > n·.

*wa

179. (24; M *21) M-SM yú?à, M-SE, M yū?và; C ?īī?vā; T-Ch ?we?e^{3}, T-Co yu?wi?, T-I yu?we? ice, frost. Plte syll: M, C, T *yu.

180. (*23; C *11) M-SM yū?à, M-SE, M yū?và; C ?íívà; T-Ch du^{3}?we$^{3-4}$h/?wehe^{3}, T-Co yu?wih, T-I yu?weh thread. Plte M, C, T *yu; T *θu.

181. (*42) M-SM k^{w}à?ā, há?ā, M-SE k^{w}à?ā, hé?ē, M-J ku?va to give; C kā?à (po and pt), hā?à (pr), nā?à (pp) to give, to sting, tāà?và to send things, dā-hā?à? a gift; T (g)a^{3}?wi$^{3-5}$? to give, to strike; A kwa? to strike. Plte syll: M *k^{w}a, *xa; C *k^{w}a, *xa, *ka, *na (with merger of po and pt), *ta, *xa with prior da-; T {*ka}.

182. (*32) M-SM, SE k^{w}à?ā, M-J ku?va brother of a woman, sister of a man; C kāā?vā brother; T žu^{3}gwe$^{3-4}$h brother of a woman, sister of a man. Plte syll: M, C *k^{w}a; T adds žu^{3}-.

183. (*22/*33) M-SM tī-kà?vá, M-J ti-kava plum; T ru^{3}gwi^{3} ?i^{3} peach. A possible C cognate does not fit in here unless there was a unique situation of *wa/*wɔ: ?vī?ī fruit, (ndūūtē) ?vī?ī peach. Possibly no plte syll. M adds ka-, with prior tī- thing. T has ru^{3}- < ču^{3}h oval-shaped.

184. (*42; T *41) M-SM, SE, J và?ā; T we^{3}?e^{2} good, fine.

185. (*24) M-SM tī-k^{w}àá, M-SE tī-kùvā; C ?yáává; T ža^{3} wi$^{5-3}$ butterfly. PM *k^{w}ava became k^{w}aa or kuva by reduction of sequence of labials; T vowel is a bit difficult and may be a borrowing from T-Co. Plte syll: M *k^{w}a; C *ya; T *ta.

186. C kā-vā?à (po and pt), hā-vā?à (pr), nā-vā?à (pp); T na^{3}na^{2}?wi^{5}h to recite prayers, to chant. Plte syll: C *k^{w}a, *xa, *ka, *na; T *na (with prior na^{3}-).

187. (*22; T *21) M-SM, SE tāvā to draw out, to disrobe, M-SM tāvā ?īní, M-SE tāvā-nì to be courageous, to dare; T w·e^{3} fierce, formidable, ža^{3}wi^{2} to lick (with the tongue). Plte syll: M *ta; T *ta in one form, with loss of plte indicated in other form by strengthening of w > w·.

188. M-SM ?ānú, M-SE ?ánvá heart, M-J (čiki) yuva stomach; C čî-dáāvá heart; T $ru^{3}wa^{2-3}$ insides of. (The M-SM development is somewhat obscure.)

*ya

189. (*34; M *14) M-SM yáā, M-SE yáá; C č?īīyā; T ya^{3-4}, $y\cdot a^{3-4}$; A tsah tongue. No plte syll. C č?īī- is of obscure origin. T y/y· variation probably indicates that the strengthening of y > y· is a late analogical development in some idiolects, rather than a reflex of a lost PMx plte syll.

190. (*22?) M-SM, SE, M yā?ā; C ī-?yāā?; T $da^{3}?a^{3}h$/ $ya^{3}?a^{3}h$ chile pepper. No plte syll. C adds i-.

191. (*33?) M-SM, SE, M yāà; C ī-yēíyèì; T $ya^{3}h$; A tshaa? ashes. The C diphthongization is probably resultant on PC sequence *ey in the reduplicated root and is essentially a development in the first syllable with subsequent spread to the second syllable. No plte syll. C reduplicates and adds i-.

192. (*33/*23; T *11) M-SM yāà, M-SE yää music; T $yą^{2}$ $?ąhą^{5-4}$ musical instrument; A sam music, song, dance. The T verb (g)$a^{3}?yą^{2}h$ blow may possibly fit in here.

193. (*23) M-SM ?ī?à, ?ī?yà saint, god, sacred personage, +yà, M-SE yāà, M-J ya; C (tīīlō) ī-hą́?ą stone gods (pre-Columbian remains); T $yą^{3}?ąhą^{4-3}$ saint, god, sacred personage, gi^{3} $?yąhą^{4-3}$ holy day, festival; A t?o (sg), nt?ɔ (pl) god, saint. C ?i̱yà people, ?i̱yà (n?dííkò) saints is of possible pertinence here. Ult syll: M, T *y-; C *x- (with addition of i-). No plte syll. M-SM has added some ?i- element. T has gi^{3}- < gwi^{3} day.

*tɔ

194. (*33; M *11) M-SM čítú full, sčítú to fill, M-SE čītú full, skútú to fill, M-J čitu full, sa-kutu to fill; C dīītū full, dā-kūùtú (po and pt), ī-dā-kūùtú (pr), ní-dī-kúútú to fill; T $ni^{4}ča^{3}$ full, (g)$a^{3}ča^{3}$ to fill. Plte syll: PM has fusion of *dV + ya > či; *k^{w}a. PC has fusion of *dV- + *ya > dii-; *k^{w}a. T *ka, and ni^{3}- 'stative' prefix.

195. (*43) M-SM, SE, J tōō; T $nga^{3}ča^{5-3}$ a span (measure). No plte syll. T has some nga^{3}- element.

196. (*22; M *21) M-SM kútū, M-SE kūtú safe, secure (tones of M-SE cognate are obscure); T (g)$a^{3}ča^{3}(za^{5}?)$, $na^{3}ča^{3}(za^{5}?)$

to put away securely (may be same root as 194).

197. M-SM, SE kīt̀ì to boil. k. (čì̄ī) to have a stomach ache; C (kā?à) kúútū̄ to warm, (kūūvē) kūūtù? to get warm. T (g)u^{3} yą$^{3-4}$h to boil, (g)u^{3}?ya$^{3-5}$? (ri^{3}ki^{3}) to have a stomach ache. Ult syll: M, C *t-; T *y. Plte syll: M, C, T *ku. This is presumably a root inflected according to paradigm A, i.e., a PMx noun, but with PMx verbal derivatives derived by addition of *ku-.

*kɔ

198. (*34) M-SM, SE yōkō; T ka^{3-4-3} ear (of grain). Plte syll: M *yV-.

199. (*24) M-SM ^{n}dī̄kì, Ī̄kì, M-SE ^{n}dī̄kī̄, M-J ^{n}dikį; T ni^{5} ka^{5}? short. Plte syll: M *^{n}di, *li; T *^{n}di.

200. (*22/*33) M-SM ti-yǒkǒ, čǒkǒ, M-SE čòkó, M-J tyoko ant; C ?ī̄ī̄kō̄ louse, ?yāākō fly; T žu^{3}kwa^{3} ant. Plte syll: M has fusion of ti + *yV > čo and tyo; C *yu, *ya; T *tu/*ta.

201. (*24, *23; C, T *21) M-SM, SE, J kōò snake; M-J ku-(yoti) lizard; C kúú snake; T žu^{3}kwa$^{1-2}$ snake, ži^{3}ra^{3}kaha$^{4-3}$ lizard; A katsko (sg), kalko (pl) lizard. No plte syll. T adds žu^{3} animal, and ra- (< čV- element) with prior ži^{3} (< žu^{3} animal with regressive 'r' effect on the vowel.

202. M-SM, SE, J súkų́ tall; T ža^{5}ka$^{5-3}$ tall; A tko long. Plte syll: M *θɔ; T *tɔ (apparent overlap of 'θ' and 't' declensions.)

203. M-SM, SE sūkų̀ neck; T gą^{3} windpipe (usually in the phrase gą^{3}-ži^{3}a^{2} 'windpipe of the neck') zi^{3}-gą$^{4-5}$ throat. T has weakened the *k to g in position of relatively less stress in such a phrase as that quoted, with subsequent leveling to g everywhere. Plte syll: M *θɔ (or vowel of some other quality regressively assimilated); T zi^{3}- is an analogical extension of zi^{3}- possessed marker.

*θɔ

204. (*23) M-SM nāsù, M-SE nā-sùū none of, it isn't so (answer to question.) T ni^{3}ta^{4}h nothing of. Possibly no plte syll. M adds na-; T adds ni^{3}-.

205. (*22; T *21) M-SM, J, M kōsō, yǒsō, M-SE kōsō, yǒsó; T (gi^{3})ta$^{2-1}$/ta^{5}h to mount, to be on top of; A sho high mountain, -walho/-talho to be on top of. Plte syll: M *k^{w}i, *yi (with *yi >

yo by analogy with kõsõ); T *ki.

206. (*22) M-SM kū-^{n}dīsō, ^{n}díšō, M-SE kō-^{n}dīsō, ^{n}díšō, kōnsō, M-J ^{n}diso, k^{w}iso, M-M ^{n}diso, viso to take, to carry away; T (g)a^{3}ta^{3} to carry. Plte syll: M *^{n}dɔ, *k^{w}ɔ, *wɔ (with ^{n}di- by analogy to reflex k^{w}i- of *k^{w}ɔ); T {*kɔ/*k^{w}ɔ}.

207. (*23; M *11) M-SM ^{n}dūsù tone, voice, čísó to reply, to add, M-SE ^{n}dūsū tone, voice, čīsó, sõó to reply, to add, M-J ^{n}dusu tone, voice; C ndūūdū word; T (ga^{3})ta$^{3-4}$h to say. Plte syll: M *^{n}dɔ, fusion of PM *dV- + *yɔ > či-; C *^{n}dɔ; T *kɔ.

208. (*32; T *12) M-SM, SE k^{w}ìsō, hísō, M-J čiso to puncture; T ža^{3}ta^{2}h to sting (of a scorpion, wasp, bee). Plte syll: M *k^{w}ɔ, *xɔ; T *tɔ.

209. (*33?; C *11) M-SM, J, M ?īsù, M-SE ?īsū deer; C ?yúúdù? horse; T žu^{3}ta^{3}h deer; A kaso (sg), katso (pl) mule, k. hndai deer. (T classificatory noun dą^{2} animal of may be from this root also; if so, the passage to d may be the sort of weakening in syllables with lessened stress that has been illustrated for *k to g in T). Plte syll: M, C *yu; T *tu.

210. (*23; T *11) M-SM kāsù, hāsú, M-SE kāsī, hésī, M-J kasi, časi to close, M-SM ^{n}dāsù, ^{n}dāsú, M-SE ^{n}dēsī, ^{n}désī, M-J ^{n}dasi closed; T du^{3}ta^{2}h to cover over something (with a mat, blanket, etc.) Plte syll: M *ka, *xa, *^{n}da; T *θu/*^{n}du.

211. M yoso plain (in proper names of M origin, e.g. Yosonduchi, Ituñoso), from M of San Mateo Zozala comes the form yódó (cf. place name Magdalena Yodocono). C yúúdù? plain; T da^{3}- plain, (classificatory noun in weakly stressed position; cf. dą^{2} in 206). Cf. here M and T names of a village near Ch.: Yosonduchi (M), da^{3}-zdu^{3}ne^{3} (T). Plte syll: M, C *yɔ.

*^{n}dɔ

212. (*32; T *12) M-SM, SE, J ^{n}dõõ to stay, to remain; C kā-ndūù, ī-nd., čī-nd., nī-nd. to leave (something); T (g)u^{3} na$^{2-3}$, (g)u^{3}na^{2}h to remain, du^{3}na$^{2-3}$, du^{3}na^{2}h to leave (something). No plte syll. T adds gu^{3}- and du^{3}-.

*^{n}gɔ

213. (*42; M, T *41) M-SM hàkú (supplanted by Sp. corral in the other M dialects); T ži^{3}nga^{2} fence. Possibly no plte syll. M has ha-; T has ži^{3}-.

214. (*24) M-SM k^{w}ākù, hākú, M-SE k^{w}ēkù, hékú, M-J k^{w}aku, čaku, M-M šaku; T (g)a^{3}ʔnga$^{3-5}$ʔ; A nko to laugh. Plte syll: M *k^{w}a, *xa; T {*ka/*xa}.

215. (*34) M-SM, SE, J, M kākū, T (g)a^{3}ʔnga$^{3-4}$ to be born; A nkui to give birth to. Plte syll: M, T *ka.

216. C ndūūkū; T nga^{4} with, da^{3}ʔnga^{4} and then. Plte syll: C *^{n}dɔ; T *θɔ.

217. (*42) M-SM, SE kìkū, kíkū, M-J k^{w}iku to sew; C kāʔmą̀ (k^{w}ā̀ākū) to swear, to testify; T da^{3}ʔnga$^{?}$a$^{4-3}$ scar, proof. Plte syll: M *kɔ, *k^{w}ɔ; C *k^{w}ɔ; T *θɔ.

218. (*33ʔ) C ʔkā̀ākù (nąą̀), ʔīīkù (n.), čʔīīkù (n.), nʔdííkú (n.) to prepare little by little; T na^{3}ʔnga^{2}h/na^{2}ʔnga^{5}h to whittle, (g)a^{3}ʔnga^{2}h/(g)a^{2}ʔnga^{5}h to scrape. Plte syll: C *kɔ, *xi, *kɔ, *^{n}dɔ (with vowel palatalization in the last two forms); T *^{n}dɔ, {*kɔ}.

219. (*33) M-SM, SE, J vīkɔ̀ cloud; T nga^{3} cloud, ni^{5}nga$^{5-3}$ damp, moist; T ntska cloudy, drizzly. Plte syll: M *wi; T *^{n}di.

*^{n}g^{w}ɔ

220. (*23; C, T *11) M-SM, SE, J kāvà, kávà to twist; C kā-nkúú, ī-nkúú, čī-nkúù, nī-nkúú to grind; T du^{3}gwa^{2}h to twist, ga^{2}h/wa^{2}h to grind. Plte syll: M *ka; C ka-, i-; či-, ni is probably a preposed C auxiliary verb; T *θa.

*nɔ

221. (*32; C *12) M-SM, J nų̀ʔų̄, M-SE Nų̀ʔų̄; C díį̀ʔyǫ́; T yą$^{3-4}$ʔ teeth. Ult syll: M *n-, *tn-; C, T *ñ-, *y-. No plte syll. C adds dii- of obscure origin.

222. (*22ʔ; C, T *21ʔ) M-SM, SE kūnū, kúnū, to weave, kūnū, hínū to run, M-J kunu, činu, M-M kunu, šinu to run, to weave; C káánù, héénɔ̀, čéénɔ̀, néénɔ̀ to run, tīīnɔ̀ (yūùdɔ̀) blanket, tīīnɔ̄ (mą̄ą̄) underwear; T (g)u^{3}ną^{2}h to run, (g)a^{3}ną^{2}h to weave, ži^{3}ną$^{1-2}$ loom; A nam run, hnam looms. Plte syll: M *k^{w}a; *xi; C *ka, *xi, *ka, *^{n}da (with vowel palatalization in the last two tenses), tii-; T *k^{w}a, *ka, *xi.

223. (*34; C *14) M-SM, SE ʔīnū, M-J, M šanu; C yúúnǫ́; T n·ąhą^{3}; A hnam (pl) cigarette (probably original meaning, tobacco). T ko^{3}h nų^{3} tobacco may be a borrowing from M; this would account for both the vowel reflex in T and the loss of *ʔ. Plte syll: M-SM, SE *yu; M-J, M *xa; C *yu; T strengthening

of n > n· indicates loss of some plte syll.

*ñɔ

224. (*32/*34; C *12/*14) M-SM tī-ñùú (šíní), M-J tiñu (šini) stars (the first constituent means hens, the second means sky); C ?ɬɬyǫ́ stars; T ngu^{3}ya$^{4-3}$ road-runner. Probably no plte syll. M had added tï animal; C has ?ɨɨ- of obscure origin; T has ngu- of obscure origin. If these forms are traceable to PMx penultimate, then: M *tu; C *yum; T *^{n}gu.

225. (*22/*24; T *21) M-SM, J k^{w}áñū, M-SE k^{w}éñū; C ?ìyò; T žu^{3}wa^{2} squirrel (the T medial w would be a regular development in ua sequence, but it is difficult to explain the loss of medial *y). Possibly no plte syll. M has k^{w}a-; C has ?ii-; T has žu^{3}- animal. If these forms are traceable to PMx penultimate, then; M *k^{w}a; C *yu; T *tu.

*wɔ

226. (*22) M-SM, SE, J yū?ū mouth; C dūūvī mouthful; T du^{3}?wa^{3} mouth; A ndo (sg), ntue (pl). Plte syll: M *yi; C *θi; T *^{n}di.

227. (*23) M-SM, SE, J, M ^{n}dā?và; C nā-n?dùùvī (po and pt). ī-nà-n?dùùvī (pr), nī-nā-n?dūūví; T (gi^{3})na^{3}?a$^{3-4}$h to be extinguished, du^{3}na^{3}?a$^{3-4}$h to extinguish (T drops *w of medial cluster under obscure conditions here). Plte syll: M *^{n}da; C *^{n}dɔ; T *na/*nɔ.

228. M-SM, SE (^{n}dā-)vá?ā the right hand (for the ^{n}dā, cf. 148, 149); T wa^{5}? the right.

229. (*22; C *21) M-SM čò?ó, tī-yò?ó, M-SE čò?ó, M-J tyo?o flea; C ?ɬɬyó sand-flea; T žu^{3}?wa^{3}, ža^{3}?a^{3} flea; A kats?ɔ (sg), kal?ɔ (pl) flea. Plte syll: M *yu, with fusion of M ti + yo > čo and tyo; C *yu; T *tu (fused into PMx ultima).

230. (*34) M-SM, SE ^{n}dēyū food, M-J ^{n}dayu dinner; T ni^{3} a$^{4-3}$ dinner. Plte syll: M *^{n}da; T *na.

231. (*34) M-SM, SE yō?ō rope, cord, root; C ?ī?yò rope; T da^{3}?a$^{3-4}$/ya^{3}?a$^{4-3}$ cord, root; A ts?ua (sg), l?ua (pl), C ndūù cord may also be related to the cognates of this set. Ult syll: M *y-; C *y-, *^{n}d-; T *y-, *θ-/*^{n}d-. No plte syll but C adds ?ii- element (possibly from some PMx *yu element).

232. (*42; T *41) M-SM yòō, M-SE tā-yòō, throat; T ži^{3}a^{2}

neck. Plte syll: M, T *ta.

233. (*34) M-SM, SE, J kōyō to be pouring out; T (g)a^{3}yą$^{3-4}$h to pour out, to empty out. Plte syll: M *k^{w}a; T *ka.

*to

234. (*24) M-SM, SE yūtù; C ī-ʔyúútù tump-line, ʔkā-kū ʔyāàtú (po), ní-kú-ʔyáátú (pp) to tie; T zi^{3}čoʔo$^{4-3}$ the little straw mat on the tump-line. Plte syll: M *yu; C *yu (plus prior i-), *ya; T *tu/*ta.

235. (*42; C *41) M-SM hā-tṳ́ṳ́, tṳ́ṳ́ black, (^{n}dōkō) tṳ́ṳ́ the black zapote, M-SE (hɛ̃è) Nṳ̀ṳ́, Nṳ́ṳ́ black, (^{n}dōkō) Nṳ́ṳ́ black zapote, M-J tṳṳ black; C tṳ́ṳ́ soot; T (re^{3}ko$^{4-5}$) čṳ$^{5-3}$ black zapote, (zi$^{2-1}$) čṳ^{3} negro, čo^{3-5-4} soot, ma^{4}ru^{3-5-4} black (latter T form is probably a denasalization development in T itself). Ult syll: Mṳ *tn-; C, T *t-. The T r- form is difficult unless it be a contamination from ma^{4}re^{3-5-4} green and ma^{4}re^{3} red. No plte syll, but T adds ma- (found on a few words, most commonly terms for colors).

*ko

236. (*23, *32) M-SM ^{n}dàkū broom, ^{n}dūkù firewood, M-SE ^{n}dàkū broom, M-J ^{n}daku broom, ^{n}duku firewood, M-M ʔiku leaf, leafy branch, sprig; C ī-húúkù stake, ndūūkū twig, switch, ndūūkù (dīīyū) little switch; T koho^{3} herb, plant, bush, re^{3}koho$^{4-3}$ leaves, re^{3}koʔo$^{4-3}$ in the woods, in the forest; A tsko (sg), lko (pl), leaf. The presence of ʔ rather than h in the last T form may be by contamination with re^{3}kaʔa$^{4-3}$ stick, and re^{3}keʔe$^{4-3}$ splinter of set 121. Plte syll: M ^{n}dà (morpheme for hand or sprig), *^{n}dɔ, *yɔ (in M-M); C *xɔ (+ prior i-), *^{n}dɔ; T has re- < čṳ^{3} wood.

237. (*32) M-SM, SE, J sòkō hunger, M-SM kókó, M-SE kōkó to swallow; C k^{w}īīkō hunger; T zi^{3}-ko$^{3-4}$h, zi^{3}-ko$^{4-5}$ stomach. Loss of h and tones 45 in the second T form is an obscure development. Plte syll: M *θu; C *k^{w}i; T *θi. The M plte may however, not be from *θu, but so- may simply be an analogical reshaping of earlier ši- reflex (< *θi) in accordance with kókó swallow—or some such form no longer extant, should this latter etymology prove to be invalid.

238. (*23) M-SM, SE, J ʔōkð, šīkō twenty (latter only in higher numerical sequences of the vigesimal system); C ndīīkū, hāākū twenty (latter only in higher numerical sequences); T-Ch

ko^{4}, T-Co iko twenty. (T-Co levels all penultimate vowels to i in the numerals 'seven', 'eight', 'ten', and 'twenty', but T-Ch drops these vowels); A ntkyu twenty. Plte syll: M *θi; C *^{n}di; T *yi. M ʔõkð may be a late reduplication; C haa- is of obscure origin.

239. (*34) M-SM SE ^{n}dōkō zapote, ^{n}dōkō (ʔíñú) anona, M-J ^{n}doko ʔinu anona; C ndūùkù chiremoya, ndūùkū (mę̱ʔę̀) anona; T re^{3}ko$^{4-3}$ anona, re^{3}ko$^{4-5}$ (čų$^{5-3}$) the black zapote. Plte syll: M, C *^{n}dɔ; T has re^{3}- < ču^{3}h fruit, oval-shaped.

240. (*33) M-SM, SE-yōkð; T ža^{3}ko^{3} honey-bee, honey-comb; A tsku (sg), lku (pl) hornet's nest, honey-comb. Plte syll: M *yɔ; T *tɔ.

241. (*34; C *14) M-SM kō ʔõ, hí ʔī, M-SE kō ʔō, hí ʔí, M-J ko ʔo, či ʔi; C kú ʔú, hí ʔí, čī ʔì, ndí ʔí; T go^{3} ʔo$^{3-4}$; A -lua, -t ʔua -t ʔua, -nk ʔua to drink. Ult syll; M *k-, *x(i); C *k-, *x(i), *k-, *^{n}d- (with vowel palatalization in last two tenses); T *k-.

242. (*33) M-SM, SE, J kõ ʔð; C kū ʔū; T go^{3} ʔo^{3} plate, bowl; A šua (sg), ndua (pl) clay pot. Cf. with the A cognates the T gu^{3} kwaha$^{4-3}$ large pot for liquor; alternatively, this T form could be reconstructed with above in which case we could assume: (1) a root with last syllable *kɔ ʔ and tones *23, (2) expansion of M and C forms from CV ʔ > CV ʔV, (3) development of T kw in regular fashion after a Cu- prefix, and (4) borrowing of the T form go^{3} ʔo^{3} from M.

243. C dà-kų̱̄ (po and pt) ī-dà-kų̱̄ (pr), nī-dī-kų̱̄ (pp) to dry; T na^{3}ko^{2} to be dry, na^{5}ko$^{5-3}$ dry. Plte syll: C *θa; T *^{n}da/*na.

244. (*33/*23/*24; C *11/21; T 45 may be by analogy with da^{3} ʔnī$^{4-5}$ ʔ uncle, set 275) M-SM, SE šīkù niece; C dáákù nephew; T zdu^{3}kų$^{4-5}$ ʔ nephew (similarly, M 'nephew' ~ CT 'niece'; cf. 13). Plte syll: M *θi; C *θa; PT *žda.

245. (*22) M-SM čúkų́ louse. tĭ-yūkų̄, čūkų̄ fly, M-SE čùkú louse, čùkų́ fly, M-J tyuku k^{w}i fly; T žu^{3}ku^{3} animal, insect. (For T assume that PT *ko > ku after development of žu^{3} in first syllable; the sequence u...o does not occur in the same T word). Plte syll: M *yu, fusion of ti- + *yu > ču- and tyu-; T *tu.

*θo

246. (*23/*32/*34) C dūùdú fur, feathers, yūùdð (lų́̄) hair of the head; T to^{3-4-3} fur, feathers, re^{3}to$^{4-3}$ blanket; ga^{3}to$^{4-3}$ moldy; A so wool, liaso (sg), liatso (pl) blanket. Plte syll: C

*θɔ/*θu, *yɔ/*yu; T has re- < čV- element, and ga^{3}- (fused auxiliary verb). (M tɳ̱ų̱, Nɳ̱ų̱ feathers may be an alternative paradigm with *tnom. This would make basic tones *32.)

247. (*32; M *31, C *12) M-SM, SE yɔ̀sɔ́; C yúúdɔ́; T to^{3-4-3}; A (tshɔ?) su metate, grind stone. Plte syll: M, C *yɔ.

248. (*23) M-SM, J kūsù, kīší, M-SE kūsù, kíší; C kū-yààdō, ī-yāādō, kī-yāādō, nī-yāàdō; T (g)$a^{3}to^{3-4}$h; A tsam (sg), nda (pl) to sleep. Plte syll: M *k^{w}a; C *ya; T {*ka}, *ya. M kiši by palatalization in that language.

*^{n}do

249. (*23; C *11) M-SM, SE, J ^{n}dōò; C ndúú; T do^{3-4}/yo^{3-4-3} sugar cane; A tsho (sg), lho (pl) sugar cane, ntu cane leaves. Ult syll: M, C *^{n}d-; T *^{n}d-/*θ-, *y-.

250. (*23) M-SM, SE yɔ̄ɔ̀ moon, month, M-SM nù-^{n}dɔ́ɔ́, M-SE nū-^{n}dɔ̀ɔ́ trough, manger, corn measure; C ?īīyɔ̀ moon, month, (tūmí nyą̱ą̱) ?īīyù̀ full moon, ī-ndúú trough; T $ri^{3}o^{4-3}$ trough, manger, corn measure (almost any thing hollowed out or concave). Cf. 262. Ult syll: M, C *^{n}d-, *y-; T *y-. No plte syll. M adds nu-. C adds ?īī- (possibly < PMx *yu). T has ri- < $ču^{3}$h oval-shaped.

251. (*24; T *21) M-SM, SE, J ^{n}dɔ̄?ɔ̀; T do^{2}/yo^{2} tenate (handleless palm-leaf basket); A tsɔ (sg), ntɔ (pl) handleless basket. Ult syll: M *^{n}d-; T *^{n}d-/*θ-, *y-.

252. (*34) M-SM, SE ^{n}dɔ̄?ɔ̄, ^{n}dɔ́?ɔ̄, to suffer, M-SM tī-^{n}dɔ́?ɔ̄, M-SE tù-^{n}dɔ́?ɔ̄ trouble, calamity, a bother, M-J tu-^{n}do?o to suffer; C dį̱ɻ̱-ndɔ̄?ɔ̀ to bother; T $dr ą^{3-4}$?) $yų^{4}$?$ų^{3-4}$h to bother, to pester. Ult syll: M, C *^{n}d-; T *y-.

*^{n}go

253. (*23) M-SM yākù, M-SE hēkū some, a bit of; T ?ngo^{4} one, go^{4}?ngo^{4} a few of, some, a^{3}?ngo^{2} another. Plte syll: M *ya, *xa; T *ya, and reduplication in second T cognate.

*no

254. (*23/*32/*34) C kūùnɔ̀, hīìnɔ̀, čīīnɔ̀, nīīnɔ̀ to plant, to sow, kɔ̄-nų̱ų̱, ī-nų̱ų̱, kɛ̄-nų̱ų̱, nī-nų̱ų̱ to dress oneself; T (g)$u^{3}nų^{3-4}$ to plant, $na^{3}nų^{3-4}$ to dress oneself. Plte syll: C *k^{w}a, *xi, *ka, *^{n}da (with vowel palatalization in the last two tenses); T *k^{w}a, *na.

255. M-SM, SE, J núū, for a short time, M-SM, SE hínū an occasion; C (kᾱ?ą̀) tǫ́ǭ to go again; T yų^{5} an occasion, yų^{2} another occasion, another time. Ult syll: M *n-; C *t-; T *y-. No plte syll. M adds hi-.

*ñio

256. (*33) M-SM (yūkù) ñūù, M-SE ñūù; C hīīyǫ́; T dų^{3}/yų^{3} palm tree. Ult syll: M *ñ-; C *ñ-/*y-; T *^{n}d-/ *θ-, *ñ-/ *y-. No plte syll. C adds hii-.

257. M-SM tíñū, M-SE Níí, M-J tiñi; C ?dǫ́ǫ́ fingernail. Ult syll: M-SM, J *ñ-; M-SE *tn-; C *θ-. No plte syll. M adds ti-.

258. (*33, *33?) M-SM nīñî, M-SE nīñì, M-J niñi; C yǭǭ?; T tų^{3}; A niam? blood. Ult syll: M *ñ-; C *ñ-/*y-; T *θ-. No plte syll. M reduplicates.

*yo

259. M-SM ^{n}dā-yó?ō, M-SE ^{n}dā-yó?ò corn fodder; dried corn-stalks; C hīīyō? bamboo; T-Ch gi^{3}?yo$^{5-3}$, T-Co go?yo?o corn fodder; A ts?am tsho cornstalk. Possibly no plte syll. M preposes ^{n}dā- hand, sprig. C adds hii-. T adds gi-. The C and T plte may hark back to PMx *xi and *ki respectively.

260. C ndōōyò; T yo?o^{3} year. Possibly no plte syll since T does not strengthen y to y'. C adds ndo-.

261. (24; T *21) M-SM, SE ^{n}dē?yù, M-J ^{n}da?yu mud; T ži^{3}?yo$^{1-2}$ mud-hole. Plte syll: M *^{n}da; T*ta.

262. (*23) M-SM hīð, M-SE hīyò, M-J čiyo; T ži^{3}o$^{4-3}$comal (the clay griddle on which tortillas are cooked). T ži^{3}o^{4} (yʌ^{3}h) the circle of 3 stones on which the comal is placed (cf. 250). Plte syll: M, T *xi.

*?o

263. M-SM, SE, J, M ?ǭ?ǫ̀; C hǭ?ǭ; T ?ų^{5}?ų^{5}; A aum five.

*tu

264. (*34, *32/*42; M *31/*41) M-SM yūčī, tī-yúčí something powdered, ñìtí sand, M-SE yūčī powder, something powdered, ñìtí sand, M-J yuti powder, sand, powdered, M-M yuti sand; C (yą̄?ą́) ndūùtè? sand; T ču^{3-4-3} powder, da^{3}ču$^{4-5}$ (čų^{3}) sawdust (second constituent means wood), (yo^{3}?o$^{2-1}$)ču^{4} sand. Plte syll: M *yɔ, *ñɔ; C *^{n}dɔ; T *θɔ.

265. (*42) M-SM tī-k^{w}ìtī, M-SE tī- k^{w}ìtí, M-M ti-kwiti; T ru^{3}gu^{3}ču?u$^{4-3}$ potatoes. Plte syll: M, T *k^{w}i (with prior tī- animal, thing in M, and prior ru- < ču^{3}h oval-shaped, fruit in T; both of these forms hark back to PMx *tu? (266) but the fusions are presumably post-PMx).

266. (*22/*24/*42; T *21/*41) C ndūūtē, ndūūté (tone sandhi variants depending on following word in the phrase) egg, fruit, vegetable (used as a classifying noun in many phrases involving various sorts of oval or spherical shaped objects); T ži^{3}ču$^{2-1}$/ ču^{3}h egg, fruit (a classificatory noun with a broad range of meaning similar to that stated for C). The T prefix rV^{3}- oval-shaped, spherical is from this root but has become homophonous with rV^{3}- wooden < ču^{3} (set 110). Likewise, the M prefix tī- thing is from this root, but has become homophonous with tī- animal (see set 268). Plte syll: C *^{n}du; T {*tu}. This set may reflect a pre-PMx reduplication of the pattern *(m)tu-tu.

267. (*23) M-SM kūtù; M-SE šīNì, M-J šiti; C dūūtū nose; T (g)u^{3}čų$^{3-4}$h to sniff, to smell. (Notice the striking differences in the Mixtec dialect forms according to presence or absence of influence of PMx and PM *-m.) Ult syll: M *tn-; C, T *t-. Plte syll: M-SM, T *ku; M-SE, J, and C *θu.

268. (*22/*34/*43) M-SM, SE kītī, M-J kiti ku?u; C ?īītē; T žu^{3}- animal. Plte syll: M *ki; C *xi.

*ku

269. (*22; T *21) M-SM, SE ^{n}dīkī, M-J, M ^{n}diki, horn; T ku$^{1-2}$ bone, horn (cf. set 74 which is rather similar to this one). Plte syll: M *^{n}dV-.

270. (*33?/*23; T *11) M-SM hikì corner, M-SM, SE sīkì contrary to, on top of, concerning; M-SE yīkì corner; T zi^{3}ku^{2}h corner (cf. set 77; there may be some sort of unanalyzed connection between some of the sets grouped under *k^{w}i and those grouped here under *ku). Plte syll: M-SM *xi, *θi-, M-SE *yi, *θi; T *θi.

271. (*23/*32/*34) M-SM ?í-sík̄i, M-SE ká-sík̄i to play; C nā-dà-kùùkū (po and pt), ī-dà-kùùkū (pr), nī-dī-kūūkū (pp) to adorn; T zdu^{3}ku$^{4-3}$ necklace, (gu^{3})du^{3}ku$^{3-4}$ to play, gu^{3}du^{3}ku4-3 Carnival (pre-lenten festival); A nkue nkyu? Carnival, -kyo?, -kyu?, -kyɔ? to play, to touch, to handle. Plte syll: M, T *θu.

*lu

272. (*22; M *21) M-SM vílū (M-J has Nahuatl loan mistu); T-Ch ži^{3}lu^{3}, T-SD l•u^{3} cat. Plte syll: M *wi; T *ti.

273. (*22, *33; M *11, T *21) M-SM vílǒ little lizard; T ži^{3} lu$^{1-2}$, lu$^{2-1}$ worm; A katsu (sg), kantu (pl) snake. Plte syll: M *wi; T *ti.

*nu

274. (*24) M-SM kā?nù, há?nù, M-SE kā?nù, hé?nù, M-J ka?nu to break, to cut, M-SM tā?nù, M-SE Nā?nù to become broken; T (g)a^{3}?nï$^{3-5}$? to cut, to chop, ži^{3}?nï?ï$^{4-3}$ burst. Plte syll: M *ka, *xa, *tna; T {*ka}, {*ta}/*xi.

275. (*34) M-SM k^{w}ā?nū, há?nū, M-SE k^{w}ē?nū, hé?nū, M-J k^{w}a?nu to grow, M-SM, SE, J, M ká?nū large, (nāná) ñá?nū grandmother; T (ru^{3}ne$^{4-5}$) ga^{3}?nï?ï$^{4-3}$ large beans; da^{3}?nï$^{4-5}$? uncle; A hndai, hndæ to be bigger, to be stronger. Plte syll: M *k^{w}a, *xa, *ka, *ña, *na; T {*ka}, *θa/*^{n}da.

276. (*32/*42) M-SM hànū, M-SE hènū, M-J čanu; C čēēnō sister-in-law. (This set is tentatively listed here but may belong under *no). Plte syll: M *xa; C has fusion of some tV- element with *ya > čēē-.

*ñu

277. (*34) M-SM tiñí, M-SE Níñí, M-J tiñi; C ?yūùdè, ?tyūùdè; T žu^{3}tu$^{4-3}$ mouse, žu^{3}tu$^{4-5}$ (gwi$^{5-3}$) rat. Ult syll: M *ñ-; C, T *θ-. Plte syll: M *tnu; C *yu, and late fusion of some tV- element in second C form; T *tu.

*yu

278. (*33?) M-SM, SE tē?yù, M-M tya?yu; T (gi^{3})ri^{3}?yu^{3}h to spoil, to rot. Plte syll: M *ya, and fusion of some tV- element with *ya > te and tya; T has ri < čV- element. The fused elements in both languages may hark back to the same PMx *tV element, but the fusions are post-PMx.

279. (*23/*32/*34) M-SM hà-?íú, M-SE (hēè) ?ìyú, M-SM tí-?íú, M-J ti-?iyu empty; C nā-?yāī to empty (the diphthongization poses a problem); T yu^{3}?uhu$^{4-3}$ hole, ri^{3}uhu$^{5-3}$ hollow reed (tones are obscure), zi^{3}u$^{3-4}$ anus, vulva; A tsui? (sg), lui? (pl) hole. No plte syll. PM reduplicates (*yu-yu > ?iu/?iyu) with prior ti-. T expands *?yu? > yu?uh (u) in one form; adds fused ru- < ču^{3}h oval-shaped and zi^{3}- possessed marker in other forms.

8. Summary and suggestions as to future research

By summarizing the salient points of the reconstructions presented in the previous sections of this study it is possible to present in broad outline the phonological and grammatical characteristics of Proto-Mixtecan—the language which lies behind Mixtec, Cuicatec and Trique.

PMx had a stock of 27 phonemes: 16 consonants, 7 vowels and 4 tones. For the purposes of this section I modify the grouping of the reconstructed consonants as presented in 2.1., by subdividing the laterals, nasals and semi-vowels into two series—a nasal series, and a semi-vowel series (including *l). This enables us to speak of five series of consonants and three orders. In the table below the consonants in horizontal line form a series, while those in vertical line form an order:

*t	*k	*k^{w}
*θ	*x	*x^{w}
*^{n}d	*^{n}g	*$^{n}g^{w}$
*n	*ñ	*m̃
*l	*y	*w

I refer to the five series from top to bottom as (1) stops, (2) spirants, (3) prenasalized, (4) nasals (5) semi-vowels. I refer to the orders from left to right as (a) alveolar, (b) palatal-velar, (c) labiovelar-labial. The vowels may be divided into (1) front vowels, *i and *e; (2) central vowels *ï, *a and *ɔ; (c) back vowels *u and *o.

The distribution of PMx phonemes is described in reference to reconstructed *CV and *CVCV forms (with certain sub-varieties to be discussed further on). In our statements it is convenient to distinguish ultimate syllables (*CV forms, and the last syllable of *CVCV forms) from penultimate syllables (the first syllable of *CVCV forms).

All consonants and all vowels occurred in ultimate syllables. There are, however, certain restrictions on consonant-vowel

combination in ultimas: (1) *^{n}g and *^{n}g^{w} of the prenasalized series occur almost exclusively before the central vowels (except, in fact, for one occurrence of *^{n}g before *o). (2) The labiovelar-labial order along with *x does not occur before the back vowels. (3) *k, *ñ, and *y of the palatal-velar order along with *t occur most typically before central and back vowels: before front vowels they occur only rarely or not at all (*k only before *i and that in but two sets; *ñ not at all; *y only before *i and that in but one set; *t only before *e and that in but one set). (4) *θ, *^{n}d, and *n of the alveolar order are the least restricted in distribution. *l of the same order occurs before both front and back vowels (*i and *u) but is of very infrequent occurrence and does not occur before central vowels in our array of cognates.

Certain consonants and vowels did not occur in PMx penultimate syllables. Of the labiovelar-labial order *x^{w}, *^{n}g^{w} and *m do not occur in penultimate syllables, while evidence for *^{n}g in that position is not very solid. Of the vowels only *i, *a, *ɔ and *u occurred in penultimate syllables. Penultimate Vm is statistically rare but apparently existed in a few forms. I attribute its occurrence to fusions of *CVm-CV sequences within the PMx period itself. Presumably all medial pre-PMx clusters of *m-C were reduced by loss of *m on fusion to PMx *CVCV—except for pre-PMx *m-t, *m-k, *m-k^{w} and *m-y, which coalesced to form the PMx prenasalized series and *ñ.

The schematic forms *CV and *CVCV introduced above subsume several sub-varieties occasioned by the occurrence of *? and *m in certain positions not filled by other consonants. These further sub-varieties are: (a) (?)CV(m)(?) and CV(?)CV(m)(?) —both with all possible combinations of the obligatory and optional elements (inclosed in parentheses) represented in the formulae. (b) *CV?V(m) with the *? interrupting the vowel of the syllable and with the entire unit monosyllabic. The latter also occurred with another *? present somewhere on the form; the data are inconclusive as to whether the second *? occurred in initial or final position. (c) There may also have been some disyllabic forms with initial *?C but the evidence for this is not very solid.

There was an enclitic or suffixal *-m occurring with considerable frequency on PMx forms. When this *-m was added to a *CV? or *CVCV? form there was metathesis of the added *-m and the final *? so that an *-m? sequence resulted. Post-vocalic *-m, whether basic in a PMx form or occurring as this added element, is the source of all M, C, T nasalized vowels—except those developed at a later date in a given language. Inconsistency

of nasalized vs. non-nasalized vowel reflex within a cognate set is occasioned by the occurrence in one language or dialect of a cognate harking back to a form with added *-m vs. the occurrence in another language or dialect of a cognate harking back to the same form without this added element.

There probably also occurred in PMx an infixal *-?- morpheme of obscure (perhaps derivative) function. This infix was added directly before the ultimate syllable consonant in *CVCV forms. This results in apparent inconsistencies in a few sets as to presence or absence of reconstructed *? in this position.

Penultimate syllables and, to a lesser degree, ultimate syllables were subject to consonantal alternation. This consonantal alternation was of two sorts. The first sort of alternation, which I have termed Paradigm A involved these three sub-varieties: *y-, *θ, *^{n}d-; *y-, *t-, *ñ-, *^{n}d-; and *y-, *n-, *t-, *tn-. Reconstructed forms characterized by this sort of consonantal alternation may be termed PMx nouns. The *θ- and *t- elements in the above alternations probably together comprised a morpheme meaning definite (>A singular, T possessed). The second sort of consonantal alternation which I have termed Paradigm B, involved *k^{w}-, *x-/*xi-/*w-/*y-, *k-, *^{n}d-/*n- with four sub-varieties occasioned by the differing variants of the second element. Reconstructed forms characterized by this sort of consonantal alternation may be termed PMx verbs. The consonantal alternations here served to mark four PMx tense-aspects. Beginning with the alternations reconstructed as Paradigm B it is possible to trace in broad outline the development of the M, C, T verb-systems.

Eight tone patterns occurred as basic in PMx forms. None of these basic patterns involved tone *1—the highest level of the four-level system. Tone *1 was restricted to tone patterns that occurred as tone sandhi variants of the basic patterns. The tone classes of PMx are clearly distinguished in that the eight basic tone patterns determine eight basic tone classes each of which had its characteristic tone sandhi variant—except that two tone classes shared a *11 variant and two of the tone classes shared a *21 variant. PMx tone sandhi was probably a tono-mechanical phenomenon like that found in present-day M and C; viz., certain forms (which would have had to have been arbitrarily listed) had tone sandhi variants the occurrence of which was dependent on the occurrence somewhere in the immediate context of another 'perturbing' form.

PMx was probably characterized by a stress-group like that found in present-day M and C. There has been a constant tendency from pre-PMx through PMx and post-PMx and on into the present

M, C, T dialects for certain elements in the stress-group to fuse together into word-like units. The origin of PMx *CVCV canonical forms was probably by such fusion of pre-PMx monosyllabic forms. Post-PMx fusions in the various languages have in some sets obscured developments in PMx penultimates or added penultimate syllables to originally *CV forms.

Future research should include (a) reconstruction of PM, PC, and PT in their own right. Pike and colleagues in the M dialects have done a considerable amount of dialect survey and have enough data on hand to initiate the reconstruction of PM. Davis and Walker have made a careful survey of practically the entire Cuicatec speaking region in Oaxaca and have already initiated the reconstruction of PC. No other T dialect than that of Chicahuaxtla has been investigated with any thoroughness, and field work of this sort must precede any attempt to reconstruct PT. (b) Reconstruction of PMx elements in enclitic position—especially the pronouns. It is very probably that the phonological developments in this position, which we may term post-ultimate, will prove to be somewhat distinct from the developments either in ultimate or in penultimate syllable. (c) Incorporation of A into the PMx reconstructions with the revamping and adjustment that the adding of a further language inevitably brings. The importance of the latter cannot be overestimated in that there has been occasion several times in the course of this study to refer to A at crucial points in our argument, viz. in reference to final *-m, and in reference to the consonantal alternations of Paradigm A which, in altered form, still characterize Amuzgo.

The above projects, once completed, should put the reconstruction of PMx on a somewhat more solid foundation than I have been able to provide for it in this study. Meanwhile—and we cannot be detained indefinitely if the above projects are not consummated—there is the further and more difficult task of lining up PMx with other presumably related stocks such as Popolocan, Otomian, and perhaps Zapotecan. Miss Sarah Gudschinsky of the Summer Institute of Linguistics hopes to initiate the task of comparing the Mixtecan and Popolocan stocks. Ecker (El Mexico Antiguo 4. 209-240, 1939) some years ago published some exploratory probings in connection with Mixtec-Otomian affinities. Mixtec-Zapotecan affinities—in spite of the confidence with which this relationship was assumed by early Mexican linguists—is still in the speculative stage. In establishing more distant relationships such as Mixtec-Otomian and Mixtec-Zapotecan it is doubtful whether the number of extant cognates will be sufficient to permit

reconstruction in enough detail to gain a very satisfactory picture of the phonological and grammatical characteristics of the reconstructed structures. It is my hope, however, that at least in respect to Mixtec-Popolocan, this will not prove true.

Extensive lexicostatistical investigation of the linguistic affinities of Mexican Indian languages is being carried on at present by Swadesh. This investigation should give some indication of what language stocks might next be compared with Mixtecan, with some probability of finding enough cognates to make such further reconstruction profitable. Glottochronology can thus function as a valuable auxiliary to the comparative method. It might not be amiss, however, to point out that as an auxiliary to the comparative method, glottochronology cannot supersede that method itself. As linguists, our interest goes beyond considerations as to what languages are related and degrees of relationship; ultimately we want to know something of the phonological and grammatical structure of the language which was the historical progenitor of a given language family. For this reason—if for no other—we heartily agree with George Lane's statement (Collitz lecture before the Linguistic Institute at Chicago, Aug., 1954) "There is no substitute for the comparative method of the nineteenth century."

APPENDIX

Tabular summaries of the phonological developments described in this study follow. In the following formulae, commas separate the reflexes of M-SM, M-SE and M-J in the order given. Slash separates varying reflexes in a given language or dialect. Conditioning factors, enclosed in parentheses, are given preceding and or following the M, C, T reflexes. An (m) in parentheses after reconstructed *CV combination indicates either (a) variant proto-forms, one with and one without post-vocalic *-m, or (b) only a possible (but not certain) reconstruction of *-m. Where the weight of probability is that a nasalized vowel in one or more of the languages is a post-PMx development I do not represent (m) at all in the formulae.

A. Reflexes of consonant-vowel combinations in reconstructed ultimas:

*te > M či, či, ti; C te
*tī > M tī; C te; T či
*ta > M (a)ta/(u, i)ča, (a)ta/(u, i)te, ta; C ta; T ča
tɔ > M tu/too/tī(?); C tu; T ča
*to > M tu; C tu; T čo
*tu > M (u)či/tī; C te; T ču
*ki > M hi, hi, či; C če; T ki
*kī > M kī/ki, kī, ki; C či/če; T kī
*kīm > M $kī_{ę}$, $ki_{ę}$, $ki_{ę}$; T kę
*ka > M ka/+ga; C ka/kuu; T ka/PT $kaka^{1}?$ > $ga^{3}če^{2-1}$/(u)kwa
*kam > M kę; T kę/PT $kakę^{1}?$ > $ga^{3}či_{ę}^{2-1}$
*kɔ > M ko/kī(?); C ko/kuu; T ka/(u)kwa
*kɔm > M $ku_{ę}$; T kę
*ko > M ku/ko; C ku/ko; T ko
*ku > M kī/(i)ki, kī, ki; C ku; T ku
*k^{w}i(m) > M $kų_{ę}$; C ku; T kwi
*k^{w}ī > M ku; C ku/ko; T kī
*k^{w}a > M (a)kwa/(u)ku/(i, ī)ka; C (v)kwa/(space)kuu; T kwa/kwe(h)
*k^{w}am > M(V)$kų_{ę}$/(space)$k^{w}ę?ę$/(space)$kęę_{ę}$; C (space)$kę?ę$/(space) $kwęę_{ę}$; T kwę
*θi > M ši; C di; T ci
*$θi_{ę}$ > M $ši_{ę}$; T $ci_{ę}$
*θe > M ši; C de
*θī > M šī; C di; T ci
*θa > M sa; C da; T ta
*θɔ > M su/so; C du; T ta
*θo > M su/so; C du/do; T to
*θu > C de; T tu
*xi > M hi, hi, či; C či; T či

*xim > M hį, hį, čį; T čį
*xe > M hi, hi, či; T če
*xï(m) > M hą, hę; C čẹ; T kį
*xa > M ha, he, ča; C ka; T ka/disyllabic ži?i
*xa(m) > M hą, hę, čą; C ku; T ką
*x^{w}i > M hi, hi, či; C ku; T gwi
*x^{w}e > M hi, hi, či; C va; T gwi
*x^{w}im > M hį, hį, čį; C kų; T gį
*x^{w}a > M (V)k^{w}a/(space)vaa; C (V)ku/(space)vaa; T gwa
*^{n}di > M či, či, ti; C nę/nį; T ne
*^{n}de > M či, či, ti; C na; T ne
*^{n}dï > M ^{n}dï; C (V)ni/(space)^{n}duu; T nï
*^{n}da > M (CV)ča/(CV?)^{n}da/-^{n}ǰaa/(space)^{n}da(± ?)a, (CV)te/(CV?)^{n}de/-^{n}dee/(space)^{n}da(± ?)a, (CV)ta/ (CV?)^{n}da/-^{n}daa/(space)^{n}da(± ?)a; C (CVV)nę/(CVV)nį/(space)nda(± ?)a; T (CV)ne/(space) da(± ?)a
*^{n}dɔ > M ^{n}doo; C nduu; T (V)na
*^{n}do > M ^{n}do(± ?)o; C nduu/ndo?o; T (space) do
*^{n}ga > M ha, he, ča; C nga?a; T nga/disyllabic ži?i
*^{n}gɔ > M ku/ko; C ku; T nga
*^{n}go > M ku; T ngo
*^{n}g^{w}i > M (V)vï, vï, vi; C (V)ve; T (space)gwi[3]/(V)ngwi
*^{n}g^{w}a > M (V)va; C (V)va; T (space)gwe/(V)ngwe
*^{n}g^{w}a(m) > M (space) kųų; C (space) kųų; T (space) gą/(space) ngwą
*^{n}g^{w}ɔ > M (V)va; C (space)nguu; T (V) gwa
*li > M li; C lį; T li
*lu > M lu/lo; T lu
*?mi > M ?mu, ?mu, ?mi; C ?mi; T mi?
*?(m)im > M ?ų; C ?į; T ?(m)ą
*?mï(m) > M ?ï/?į, ?į, ?i; C ?ma/?mą; T ?ą/?mą
*?ma > M ?ma; C ?ma/?me; T ?mą
*?(m)am > M (V) ?ą/(ñu) ?ų; C (V) ?ą; T possibly (V) ?o
*ni > M ni; C mu/no; T nï
*na > M na; C na; T ne
*na(m) > M nu; C nąą; T ną
*nɔ(m) > M (V)nu/nų?ų; C nu/no/nǫ; T ną
*no(m) > M nu; C no/nųų; T nų
*?nu? > M ?nu; T ?nï?
*ñï(m) > M nï/ni, ñi, ñi; C yųų; T yą
*ña(m) > M ñu/ñų?ų; C yą; T yą
*?ña(m) > M ?ą, ?ña; C yą; T ?yą
*ñɔ(m) > M ñu; C yǫ/yo; T ya/(žuw)a
*ño > M ñi, ñï, ñi
*ñom > M ñu; C yǫ/yųų; T yų
*ñu > M ñi, ñï, ñi
*wi > M (V)u, (V)u, (V)vi; C ve; T wi/(u)gwi
*we > M (V)u, (V)u, (V)vi; C va; T wi

*wi > M (V) vi, (V)vi, (V)vi; C vi; T wa
*wa > M va; C va; T (space)we; (a)wi, (u)wa
*ʔwa > M ʔa, ʔva, ʔva (but (kʷa)ʔa, (kʷa)ʔa, (ku)ʔva); C va/ʔva; T (u)ʔweʔ(or h), (a)ʔwiʔ(or h); with metathesized *-ʔ-: (u)gwe(h), (u)gwi(ʔ)
*yim > C (V)ị; T (V)ị
*ya > M ya; C ya; T ya
*yɔ > M yo; C yo; T (Ci)a/ya
*yo > M yo/ʔyu; C yo; T (Ci)o/yo
*yu > M yu/(Ci)u, yu, yu; C yai; T (Ci)u/yu
*tna(m) > M tą, Ną, tą; T rą
*tnu, *tno > M ti, Ni, ti

B. Reflexes of consonant-vowel combinations in reconstructed penultimate syllables. In the following, ï is to be understood as occurring only in M-SM, SE with corresponding reflex i in M-J, M.

*ti > M tï(Cï); C tuu(m, v); T ži/žu(ʔw)
*ta > M ta; C taa/tee(če); T ži(č)/žu(gw)
*tɔ > T ža/ži(č)
*tu > M tï(Cï)/ti(či); C tii(ko, ʔv, kʷ); T žu/ži(č)
*ki > M ki(n, s)/kï(Cï); C čii; T gi
*ka > M ka/ke(haʔa); C kaa; T ga
*kɔ > M ki/kï(Cï); C kaa; T ga
*kʷi > M ku/kʷi(*ʔC)/ko(Co); C kʷii; T gu
*kʷa > M ku/kʷa(*ʔC); C kuu/kaa(ʔm, *ʔw); T gu
*kʷɔ > M ku/kʷi(*ʔC); C kuu/kʷaa(ku < *ʔⁿg); T ga
*θi > M ši/šų(ʔų); C dii/duu(v); T zi/zą(ʔąhą)
*θa > M sa/s(taa) but M-J ši(ta); C daa/dii(no)/dee(no); T da/di(c, n, (*y)a)/du(m, (ʔ)w, gw)
*θɔ > M su(Cu)/ši(Ci); C duu(d); T da/du(gw)
*θu > M sï(Cï); C duu(t)/dịị(ʔmą); T du
*xi > M hi, hi, či; C hii/hee; T ži
*xa > M ha, he, ča; C haa/hii(no); T ga
*xɔ > M hi, hi, či; C hŭu; T ga
*ⁿdi > M ⁿdi; C ndii/nii(no); T ni(k, ng, č)/du(ʔw)/di
*ⁿda > M ⁿda (but M-SM, SE ⁿde(ʔyu)): C ndaa; T na(k, gw, č)/da
*ⁿdɔ > M ⁿdu/ⁿdï(Cï)/ⁿdo(Co); C nduu/nụụ(ne); T na (kw, ʔng)
*ⁿdu > M ⁿdu/nu(ni); C nduu/nụụ(nę)/nịị(nǫ); T du/di(ʔnï)
*ni > T ni
*na > M na; C na; T na/ni(*y)a
*nɔ > M nu(u)
*ffa > M ffa(M-SM ffe(ffu)). The C and T reflexes merge unconditionally with reflexes of *ya.
*ffɔ > M ffi(Cï). For C, T see above.
*ffu > M ffi(ʔi). For C, T see above.
*wi > M vi; C vii(nu, no)

*wa > M va(hi)/ʔu(ni)/ʔi(ñu); C ʔii(nu); T wa
*wɔ > M vi(š, s)
*yi > M yi/yu(ʔu)/ʔi(n) and M-SE yi(Ci), ʔi(N); C ʔii
*ya > M ya/ʔi(ñ, s) and M-SE ye(N); C yaa/hii(va); T a/yą(ʔą)/yo (ʔo) and T-Co yu(wi)
*yɔ > M yu/yi(Ci) yo(Co); C yuu; T a/ya and T-Co ya(ʔw, w), but yu(w < *$^{n}g^{w}$)
*yu > M yu/yo(Co)/ʔi(n, s, č, y); C yuu/hii(ʔ)va, (ʔ)ma, ko, ku); T-Ch zero; T-Co yu

C. No tabular summary of reflexes of *ʔ in various positions is offered here because the complexity of developments in M, C, T makes such tabulation overly intricate; see 5.

D. Reflexes of reconstructed tone patterns.

D.1. Basic patterns.

*22 > M ˉˉ; C ˉˉˉ; T (3)3 (< PT *22)
*22ʔ > M ˉˉ; C ˉˉˋ (± ʔ); T 2h, leveled to T 3h in most nouns (< PT *2ʔ)
*33 > M ˉˋ; C ˉˉˋ; T (3)3 (< PT *33)
*33ʔ > M ˉˋ; C ˉˉˋ (± ʔ); T 3h(< PT *33ʔ)
*23 > M ˉˋ; C ˉˉˋ; T 34(< PT *23)
*32 > M ˋˉ; C ˉˉˋ; T 34(< PT *23)
*34 > M ˉˉ; C ˉˋˋ; T 45, leveled to 34 in almost all contexts (< PT *34)
*43 > M ˉˉ; C ˉˋˋ; T 35(< PT *24)
*24 > M ˉˋ; C ˉˉˋ; T 35(< PT *24)
*42 > M ˋˉ; C ˉˉˋ; T 35(< PT *24)

D.2. Patterns in tone sandhi variants:

*21 > M ˊˉ (M-SE ˊˉ/ˆ); C CV́V́CV́, CV́ʔV́, CV́V́, CV́V̀ʔ, CV́V́CV̀ (*ʔ); T 2-1 (< PT *1ʔ) 2 (< PT *1)
*11 > M ˊˊ (M-SE ˊˊ/ˉˊ); C CV́V́CV̀, CV́ʔV̀, but CV́V́/CV́V̀; T 25h/2h (< PT *12ʔ) and 23 (< PT *12)
*14 > M ˊˉ (M-SE ˊˉ/ˆ); C CV́V́CV́, CV́ʔV́, CV́V́; T 25h/2h (< PT *12ʔ) and 23 (< PT *12)
*13 > M ˊˉ; C CV́V́CV̀, CV́V́; T 25h/2h (< PT *12ʔ) and 23 (< PT *12)
*41 > M ˋˊ; C CV́V́CV̀, CV́V́; T 2-1 (< PT *1ʔ) and 2 (< PT *1)
*31 > M ˋˊ
*12 > C CV́V́CV́; T 25h/2h (< PT *12ʔ) and *23 (< PT *12)

INDICES

In these indices the location is given for every citation of a M, C, T or A form mentioned anywhere in this volume, whether or not that form is included in the array of cognates in section 7. For forms included in the array of cognates, the underlined number immediately following the form is that of the set number in section 7. Page numbers followed by an asterisk indicate that the form is cited only by set number. M and C verbs are regularly indexed only by the form of the potential aspect. Trique verbs are regularly indexed only by the form occurring with the g(V)-non-continuative aspect prefix for verbs occurring with this prefix. Trique nouns are regularly indexed only by the possessed form for nouns having a formally distinct possessed stem.

Index of Mixtec forms

Index of Cuicatec forms

Index of Trique forms

Index of Amuzgo forms

ERRATA

1. The Cuicatec phoneme k^{w} is with some frequency transcribed erroneously as kw. Similarly the Cuicatec cluster nd is sometimes transcribed erroneously as the unit symbol ^{n}d.

2. Page 37, second paragraph from the bottom. In the citation of set 145 the Cuicatec forms have been omitted. See set 145 in the array of cognates (section 7).

3. Page 43, center paragraph. In the citation of set 27 grandson is given as the meaning of the Cuicatec form rather than the correct meaning granddaughter.

4. Page 56. The first sentence of 4.1.1.6. should read as follows: . . . M typically preserves *y- and *ñ- forms of the above paradigms . . .

5. Page 68. The first sentence of 4.2.6.0. should be modified to read as follows: There are some twenty-six instances in our cognate sets of T r in penultimate syllables. (The six additional instances of T penultimate r that are not discussed in 4.2.6. in no way modify the conclusions of that section.)

6. Page 71, statement (2) of first paragraph of 4.3.1.2. The following sentence should be added at the conclusion of this statement: Reflex e also occurs after M-SE k^{w} when any consonant except glottal stop initiates the following syllable.

7. Page 118, set 20. The formula (*23; C *11) should read as follows: (*23, *24; C *11).

8. Page 122, set 45. The formula (*33) should read as follows: (*24, *33).

9. Page 124, set 67. Add the meaning hole after the Amuzgo forms.

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