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UNEARTHING THE ROOTS:
AO AND PROTO-TIBETO-BURMAN – THE RIMES[*]

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1. INTRODUCTION

1.1. *Purpose*

This paper presents the results of an investigation into the historical development of Ao, a Tibeto-Burman language of Nagaland in northeast India. Ao reflexes of Proto-Tibeto-Burman roots are identified using the latest PTB reconstructions, and sound changes are described. As Ao is a member of the under-studied 'Naga'[1] cluster of languages, the results of this research will be useful for establishing subgroups for the Naga languages based on shared patterns of phonological innovation, for reconstructing mesolanguages of these subgroups, and for determining their appropriate positions within the larger Tibeto-Burman family.

The remainder of the paper is as follows: §1.2 introduces background information on Ao, §1.3 presents phonological sketches of the Chungli and Mongsen dialects, and §1.4 describes the methodology utilized in this investigation. §2 presents the identified reflexes and sound correspondences grouped by each rime,[2] while §3 generalizes the sound changes and addresses issues of relative chronology. The paper is then concluded in §4. Appendix A (following the References) contains a table and diagram of the sound changes described. The table in Appendix B orders these sound changes according to the hypothesized relative chronology. An index of the cognate sets ordered by proto-gloss can be found in Appendix C.

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[1] 'Naga' is a geographic/cultural designation, and should not be interpreted as indicating a linguistic subgroup.
[2] The sound changes exhibited by initials will be examined in a subsequent paper.

1.2. Background

Ao is the dominant language spoken in the Mokokchung district of Nagaland, a hill state in northeast India. Its two main dialects are Chungli and Mongsen, which "border on mutual unintelligibility" (Burling 2003: 184). Chungli is the prestige variety and has approximately 90,000 speakers, while Mongsen speakers number around 70,000 (Coupe 2008: 1). The Ao-speaking area of Nagaland is bordered on the north and west by Karbi (formerly 'Mikir'), on the south by Lotha and Sangtam, and on the east by Phom and Chang (both of the Konyak group).[3] Also in contact with Ao is the Assamese-based creole of Nagaland known as 'Nagamese' (Coupe 2007: 4-6; see Boruah 1993).

Perhaps owing to the mountainous terrain of Nagaland and its recent violent political conflicts (see Baruah 2003), modern linguistic fieldwork in Ao has been sparse until recent years. Much of the primary research on Ao exists in works from the British colonial period, including the *Linguistic Survey of India* (Grierson & Konow 1903-1928), two short grammatical descriptions of Chungli (Avery 1886; Clark 1893), a mammoth 977-page dictionary of Chungli (Clark 1911), and an anthropological monograph on the Ao people with a grammar chapter describing the Mongsen dialect (Mills 1926). For several decades after the publication of Mills 1926, the only original research on Ao that utilized more up-to-date descriptive methods were Marrison's (1963) dissertation on the classification of the Naga languages (for which he elicited vocabulary from a Chungli consultant in Assam[4]), a phonetic reader of the Chungli dialect (Gowda 1972), a sketch grammar of the same (Gowda 1975), and Weidert's works (1979, 1987) on Tibeto-Burman tonogenesis containing a small set (<100 words) of elicited Chungli vocabulary. Beginning in the late 1990s, however, extensive fieldwork conducted in Nagaland by Alexander Coupe has yielded multiple publications on the Mongsen dialect (Coupe 1998, 2002, 2003a, 2003b), including his 526-page grammar of Mongsen Ao as spoken in Mangmetong village (Coupe 2007). Recent investigations into Ao morphology and prosodic phonology and morphology have also been produced by scholars in Hyderabad (Sanyal 2005; Sanyal et al. 2007; Temsunungsang 2006, 2008, 2009; Temsunungsang & Sanyal 2005).

Since thorough, reliable descriptive work on Ao was lacking during most of the 20th century, the genetic classification of Ao within Tibeto-Burman was (and still is) an issue of intense speculation. The tremendous diversity exhibited by the languages of the Naga cluster has also added to the difficulty of such an endeavor (Burling 2003: 182). Coupe (2003a: 5-8, 2007: 7) provides an excellent summary of the history of scholarly proposals regarding their classification. Oxymoronically, the only firm conclusion that can currently be drawn is that the position(s) of the Naga languages within TB is inconclusive. Tentative subgroupings within the Naga cluster, however, have been

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[3] See Burling 2003: 185 and Mills 1926 (map facing p. 1) for maps.
[4] See Marrison 1967: II: 331 and Coupe 2007: 29.

proposed on the basis of typological (Marrison 1967) and lexical (Burling 2003) similarities. With regards to Ao, both Burling and Marrison agree in grouping Ao with Yacham-Tengsa and Sangtam (Marrison's 'Type B-1' [I: 263]), while Burling adds Yimchungrü and Lotha to form the 'Ao Group' (Burling 2003: 184). Further work on this issue is expected from Coupe (forthcoming), who is exploring the innovation of distinctive overcounting (or 'subtractive') numeral systems in some Naga languages as potential evidence for their genetic relatedness.

1.3. Phonology

The next two sections briefly present the phonemic inventories of Chungli and Mongsen Ao.

1.3.1. *Chungli*

The phonology of Chungli Ao described here is based on the speech of my consultant,[5] which largely corresponds with inventory of Chungli presented in Temsunungsang 2009: 12.[6]

Consonants

Table 1 contains the consonant phonemes of Chungli:

	Bilabial	*Dental/Alveolar*		*Palatal/Pal-Alv.*	*Velar*	*Glottal*
Nasal stops	m	n			ŋ	
Oral stops	p	t			k	ʔ
Affricates		ts		tʃ		
Fricatives		s, z				(h)
Approximants	w	l	ɹ	j		

Table 1: Chungli consonants

All consonants may appear in the syllable onset except the glottal stop, which is restricted to coda position and is usually contrastive[7] (e.g. **a²pu²** 'carried on the shoulder' vs. **a²puʔ²** 'borrowed').

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[5] Relevant biographical information: male; born in 1968 and raised speaking a unique Phom-influenced variety of Mongsen Ao in Nokpu, Nagaland; moved to Dimapur, Nagaland in 1977 (age 9) for education, where he acquired Chungli Ao, Nagamese, and English; married a bidialectal Chungli/Mongsen speaker in 1998 and continues to use Chungli at home; relocated to America in 2002.

[6] Temsunungsang analyzes Chungli [**ts**] and [**tʃ**] as allophonic variants, which I have treated here as separate phonemes until the complementary distribution of [**ts**] and [**tʃ**] can be verified in my data.

[7] In my consultant's speech, glottal stops are not always consistent in their appearance. Until its phonemic status is more firmly established, therefore, the transcription of a glottal stop in a Chungli word

Syllable coda position is limited to the consonants /p, t, k, m, n, ŋ, ɹ, ʔ/.

The voiceless glottal fricative /h/ has a very limited distribution, only appearing in words like **hauʔ¹** 'yes', **haiʔ¹** 'okay', **ha³tʃi¹** 'sneezed', and in some loanwords.

The voiceless fricative /s/ is produced as [s], except where it undergoes palatalization to [ʃ] before the high front vowel /i/, e.g. /siʔᴸ/ → [ʃiʔ¹] 'meat'.

The voiceless affricate /ts/ and voiced fricative /z/ are always followed by the schwa phoneme /ə/.

Marrison (1967: I: 58) and Gowda (1975: 10-11) both describe Chungli stop phonemes as lacking an aspiration contrast, while Gowda also declares the absence of a voicing contrast. In the recorded speech of my consultant, voice onset time (VOT) for stops is extremely variable, indicating the total nonexistence of a stop VOT contrast. Only one minimal pair appears to consistently exhibit contrastive aspiration: [tə²pʰə²la²] 'navel', which unexpectedly contrasts with [tə²pə²la²] 'happy' (cf. Weidert 1987 ²tɯ²pɯ²la 'navel / centre' [117: #214] with unaspirated [p]). Since this exact 'navel' vs. 'happy' minimal pair exists in Mongsen, its appearance in my consultant's Chungli speech is most likely an L1 effect from the Nokpu dialect of Ao he spoke before acquiring Chungli, given that Nokpu is said to be essentially a Phom-influenced variety of Mongsen.

Vowels

Table 2 lists the vowel phonemes:

	Front	*Central*	*Back*
High	i		u
Mid		ə	
Low		a	

Table 2: Chungli vowels

The mid central vowel phoneme /ə/ exhibits a number of allophonic variations that range anywhere from [ɛ] to [ɯ], depending on the phonetic environment.[8] The full set of rules governing these allophonic variations has not yet been fully worked out, but it has been observed that /ə/ assimilates in height to an adjacent palatal glide /j/, surfacing as [ɪ].

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should be considered provisional. See §1.3.2 for a note on Coupe's analysis of the glottal stop in Mongsen.

[8] Note that Gowda (1975: 4-5) asserts a contrast between /e/ and /ɯ/, but does not provide any relevant minimal pairs. Gowda's analysis of Chungli is addressed in Temsunungsang & Sanyal 2005: 1-2.

The only tautosyllabic diphthongs that appear are /**ai, au, ui, əi**/. (It may also be possible to analyze these as sequences of vowel + glide, i.e. /**aj, aw, uj, əj**/.)

Vowel length is not contrastive in Chungli.

Gowda's phonemic analysis of Chungli vowels (1975: 4-10) includes a contrast between /**u**/ and /**o**/. In the speech of my consultant, however, [**u**] and [**o**] are simply variant realizations of /**u**/.[9]

Tones

Chungli's tone system exhibits three levels: Low (L), Mid (M), and High (H).[10] Contour tone patterns such as HL and LM do appear on monosyllables, but Temsunungsang (2008) finds that vowel nuclei lengthen to accommodate a monosyllabic contour tone pattern before an obstruent coda, though not before a sonorant coda. This leads him to regard vowels and sonorant codas as the tone-bearing units (TBU) in Chungli. In his transcription, therefore, **tsək³¹** (with an obstruent coda) is phonologically /**tsə́ə̀k**/ 'fell' and **am³¹** (with a sonorant coda) is /**ám̀**/ 'held', which preserves the analysis of Chungli tone as a register system. A systematic investigation of vowel lengthening in my data has not yet been conducted, and thus this paper will depict Chungli tones by superscript numbers following each syllable for convenience.

Underlying H tones are rare in my consultant's speech, and most surface manifestations of H appear to be the result of a dissimilatory tonal expansion process that raises M to H whenever it precedes L. This dissimilation is evident in the tonal behavior of the semantically-empty *a*-prefix, which surfaces as M when concatenated with a M verb root but as H when prefixed to a L verb root to form the verb stem:

/**aᴹ-ləpᴸ**/ → [**a³-ləp¹**]   'cut'   (M-L → H.L)
/**aᴹ-kuŋᴹ**/ → [**a²-kuŋ²**]   'crowed'   (M-M → M.M)

While it may be the case that the written, segmental aspect of Chungli has been standardized[11] to the Molung variety by the work of American Baptists and the publication of the Ao Bible (Coupe 2007: 16-17, 18), preliminary evidence indicates that tonal differences abound among villages. My consultant himself mentioned that whether a word is produced as M.M or H.H can depend on the speaker's village. This is corroborated by the Chungli lexical data contained in Ramadoss 2006: 93-98 and Temsunungsang 2009, which exhibits tone patterns that differ from those in my consultant's speech.

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[9] Whether [**u**] and [**o**] are in complementary distribution has not yet been determined.

[10] For Chungli forms, L, M, & H are represented throughout this paper with superscript 1, 2, & 3, respectively.

[11] Temsunungsang notes that "some of the Chungli dialects are unintelligible to other Chungli speakers" (p.c., 12 May 2010), so the effectiveness of this standardization effort is still in question.

1.3.2. *Mongsen*

This section summarizes the phonemic inventory of Mongsen Ao as spoken in Mangmetong village, described in Coupe 2007: 23-78.

Consonants

The consonant phonemes of Mongsen are depicted in Table 3, with Coupe's transcription system shown in parentheses where it deviates from the IPA:[12]

	Bilabial	*Dental*	*Post-alveolar*	*Palatal/Pal-Alv.*	*Velar*	*Glottal*
Nasal stops	m m̥ (hm)	n n̥ (hn)			ŋ ŋ̥ (hŋ)	
Oral stops	p pʰ (ph)	t tʰ (th)			k kʰ (kh)	
Affricates		ts tsʰ (tsh)		tʃ tʃʰ (tʃh)		
Fricatives		s z				h
Laterals		l l̥ (hl)				
Approximants	w ʍ (hw)		ɹ ɹ̥ (hɹ)	j j̥ (hj)		

Table 3: Mongsen consonants

All consonants may appear in syllable onset position. Coda position is limited to the phonemes /**p, t, k, m, n, ŋ, ɹ**/. Like Chungli, Mongsen also exhibits a coda-restricted glottal stop, but Coupe analyzes this as a prosodic feature rather than a contrastive segment (2003a: 24-27, 2007: 23-25, 50-51, 77-78). Coupe also defines a glide position immediately preceding the coda consonant, which can only be filled by the voiced labiovelar /**w**/ or voiced palatal /**j**/.

The aspirated bilabial stop /**pʰ**/ exhibits the free variants [**pʰ**] and [**ɸ**] in the speech of some Mongsen speakers.

As with the Chungli /**ts**/ affricate, Mongsen /**ts**/ and /**tsʰ**/ can only occur before the schwa /**ə**/.

Both /**s**/ and /**z**/ undergo palatalization to [**ʃ**] and [**ʒ**] before /**i**/. For some speakers, [**z**] and [**ʒ**] are in free variation before the high front vowel, while others preserve [**z**] in all environments.

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[12] Adapted from Coupe's Table 2.2 (2007: 28).

Coupe treats the voiceless glottal fricative /**h**/ as a segment unspecified for place of articulation (POA), noting its infrequent appearance (2007: 31-32).

With regard to the consonant inventories of Mongsen spoken in other villages, Longkum, Khensa, and Mekhuli Mongsen all exhibit a voiceless labiodental fricative /**f**/ in at least some words, while Khensa and Mekhuli also have voiced /**v**/.

Vowels

Table 4 depicts the vowel phonemes:[13]

	Front	*Central*	*Back*
High	i		u
Mid		ə	
Low		a a̰	

Table 4: Mongsen vowels

As in Chungli, Mongsen /**u**/ is realized as [**u**] or [**o**]. Coupe remarks that [**o**] "is mostly realized in the proximity of a velar environment, but this is not consistent enough to be stated as a rule" (2007: 45).

Also like Chungli, Mongsen /**ə**/ is susceptible to assimilatory effects and has various allophonic realizations depending on the surrounding phonological environment. In Mongsen, the contrast between /**ə**/ and /**i**/ is often neutralized when the vowel is in the initial position of a word.

Creaky-voice phonation (to be distinguished from the prosodic glottal stop) only appears on the vowel /**a̰**/, which contrasts with /**a**/. The creaky /**a̰**/ phoneme exists in only five lexical roots from Coupe's corpus, always following a labiovelar approximant (/**w**/ or /**ʍ**/): **wa̰pət** 'slope', **hwa̰-tsə** 'bamboo sap', **wa̰-pàʔ** 'to slice', **tə́nə̀m wà̰pùŋ** 'Great pied hornbill cock', and **tə́nə̀m wà̰tsə** 'Great pied hornbill hen' (2007: 46).

The vowel inventories of Mongsen spoken in the Waromung and Khar villages contain an additional high vowel, /**ʉ**/. In Waromung Mongsen, /**ʉ**/ mostly corresponds with Mangmetong Mongsen /**i**/, which Coupe takes as suggestive that a **i** > **ʉ** sound change is taking place in Waromung (2007: 48).

Vowel length is not contrastive in Mongsen.

Tones

Mongsen exhibits one tone per syllable and has three level tones (Low, Mid, High). The H tone in Mangmetong Mongsen appears "relatively infrequently in lexical roots"

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[13] Adapted from Coupe's Table 2.3 (2007: 45).

(Coupe 2007: 58), and is much less common than in Chungli (Coupe, p.c., 20 February 2010).

In Coupe's transcription system, H is represented by an acute accent over a vowel (´), M is unmarked, and L is depicted with a grave accent (`).

1.4. Methodology

The goals of this investigation are to identify the reflexes of PTB roots in two Ao dialects and describe the regular sound changes that have taken place in the rimes. Data for Mongsen Ao is taken from Coupe 2007, while the Chungli Ao forms are from my consultant work that began with a 2008-2009 Field Methods class. The process involved 1) compiling the Chungli forms into a lexical database, 2) identifying Mongsen cognates from Coupe's grammar, 3) searching for PTB roots corresponding to these cognate sets in the STEDT[14] database and various publications (e.g. Benedict 1972; Matisoff 2003, 2008, 2009), and 4) examining the sound correspondences between the reconstructed roots and the Chungli & Mongsen reflexes.

To check my elicited data, I made use of E.W. Clark's (1911) mammoth dictionary of Chungli, which deserves special mention here. First, a few caveats prevent the unqualified recommendation of this resource: Since Clark was not a trained linguist, his dictionary lacks tone indications, under-phonemicizes the Chungli inventory,[15/16] fails to designate parts of speech, proposes dubious folk etymologies of words,[17] and also lacks an English-Ao index. With those cautions duly noted, however, the dictionary is a masterpiece both in its extent and its detail. Its 977 pages contain thousands of forms with meticulously thorough definitions, such as the following:

> MONGZY̱, *mungzy̱*, a large and lightish-colored bird, as large as an eagle or large hawk; it occasionally appears, usually two or three at a time, and sails about high in the air over a Naga village uttering now and then rather piercing cries. The *Aos* have a superstition that the bird has the spirit of some dead person. It is said they are apt to appear three or four days after a man's death, and such a bird is called the *tanela* (soul) of the deceased. If they appear at other times, it is supposed to be an omen that someone in the

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[14] Sino-Tibetan Etymological Dictionary and Thesaurus (http://stedt.berkeley.edu/)

[15] Thus, Chungli /**p**/ is alternately transcribed as *b* or *p*, /**u**/ as *u* or *o*, /ə/ as *e* or *y̱*, etc.

[16] This quote from the front material of the dictionary is informative both with regard to the Chungli phoneme inventory and to the perspective of a non-linguist approaching an unfamiliar language: "As the Ao-Nagas had no alphabet until the Missionary came to them, certain letter sounds were variable. There was no distinction between the sounds of b and p or d and t; also g and k frequently suffer mutation, and sometimes b and v and m and n. The vowels are not permanent, in fact, among the words of everyday use almost any letter may be changed for facility of expression."

[17] Such as this one for 'otter', which is a reflex of PTB **s-ram**: "SHIREM, an otter probably, it is said to live on fish…The *rem* in *shirem* refers probably to the custom of the animal to hide in water, *tzy̱ nung arema*" (Clark 1911: 703).

village will die soon, that some deceased relative in the form of the bird is calling, and so someone will probably die. If it light on a tree several times near a cultivation, it is supposed to portend a death. It is believed to prey on smaller birds, wild jungle fowl, etc., but seldom carries off domestic fowls as do hawks and kites. The *Aos* seem not to know where the bird builds its nest. See *lijembang, orija, reptitsy*.
(Clark 1911: 465)

Where consultant data is unavailable, some Chungli forms from Clark 1911 appear in the cognate sets below. These forms are provided in both the Clark orthography (in FULL CAPS) and my interpretation of Clark's transcription based on the Chungli phonemic inventory.

Each cognate set below is given a unique number. All PTB roots cited can be found in Benedict 1972 ('STC'), Matisoff 1995, Matisoff 2003 ('HPTB'), or Matisoff 2008, except where an unpublished root from the STEDT database is indicated with a following superscript dagger (†). Allofamic variants of a root not reflected in the Ao data are omitted for the sake of space. For example, DREAM is reconstructed as PTB *r/s-maŋ ≍ *mak, but *mak is omitted from the tables below because both Ao forms reflect the first allofam (Chungli **puŋ²maŋ²**, Mongsen **aja-maŋ**). When a reflex is a constituent of a compound, the appropriate segmental material representing the reflex is underlined for clarity (e.g. PTB ***r/g-na** EAR > Chungli **tə²-<u>na²</u>ɹuŋ²** 'ear'). The absence of a Chungli or Mongsen cognate from a set indicates that the data is incomplete or the missing form reflects a different PTB root.

Mongsen forms conform to Coupe's orthography, presented in §1.3.2. The relational prefix **tə-** (used with kinship terms and body parts) and the non-relational prefix **a-** (used with cultural artefacts and natural objects) are enclosed in brackets, e.g. **[tə]-hnaɹuŋ** 'ear' and **[a]-sə́ŋ** 'wood' (see Coupe 2007: §7.2).

Chungli data is transcribed as in §1.3.1, differing only minimally from Coupe's transcription by employing superscript numbers instead of accents to indicate tones. Chungli verbs are given in their stem forms, which fall into two major types: *B-stems*, consisting of a bare verb root (e.g. **mə²nəm²** 'smell'), and *A-stems*, composed of a verb root with a semantically-empty *a*-prefix (e.g. **a²-sə²** 'die').[18] Chungli noun prefixes that correspond to the Mongsen relational prefix (Chungli **ta-**, **tə-**, and **tu-**) are separated from the noun root by a dash. The non-relational prefix **a-** does not appear to exist as a distinct morpheme in Chungli (e.g. 'wood' is simply **səŋ¹**) but in some cases has been reinterpreted as part of the root (e.g. Chungli **a³ŋuʔ¹** 'fish', cognate to Mongsen **[a]-hŋáʔ**).

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[18] Note that some B-stems are /a/-initial, e.g. Chungli **a³nak¹** 'scratch', in which the initial /a/ is not the *a*-prefix.

Before examining the rimes in the next section, two important sound changes should be noted. As mentioned in §1.3.1 and §1.3.2, in both dialects the dental affricate /ts$^{(h)}$/ is never followed by any vowel in the syllable other than /ə/. This distributional restriction indicates that a development occurred at the Proto-Ao stage in which all vowels merged to schwa following the dental affricate ***ts(h)-** (henceforth referred to as the 'Proto-Ao schwa-merger'). The same phonotactic restriction occurs with /z/ in Chungli (but not in Mongsen), revealing that a merger of all vowels to /ə/ following /z/ also occurred at the pre-Chungli stage, after the Chungli-Mongsen split. The consequences of these two sound changes appear throughout the data presented below.

2. RIMES

This section investigates the development of PTB rimes in Ao. §2.1 presents rimes containing PTB ***-a-**, while §2.2 examines the front vowels and §2.3 the back vowels.

2.1. *-a-

2.1.1. ***-a** > Chungli **-a/-u/-i**, Mongsen **-a**

The regular reflex of the PTB open rime ***-a** in both dialects of Ao is **-a**, illustrated below in Table 5:[19]

	Proto-Gloss	*PTB*	*Chungli*	*Mongsen*
(1)	SOUL	*m-hla	ta²-nə²la²	[tə]-hmila
(2)	MOON	*s/g-la	i¹<u>ta</u>¹	làtà
(3)	NEGATIVE	*ma-y	maʔ¹ 'no'	màʔ 'no'
(4)	BE SPENT / BE LOST† [20]	*(g/s)-ma-t	sa³maʔ¹ 'lose' a²maʔ² 'forget'	tʃhà<u>màʔ</u> 'disappear, lose'
(5)	EAR / HEAR	*r/g-na	tə²-<u>na²</u>ɹuŋ² 'ear' a²ŋa² 'hear'	[tə]-<u>hna</u>ɹuŋ 'ear' hŋa 'listen'
(6)	2ND PERSON PRONOUN	*na-ŋ	na²	(nàŋ)

Table 5: ***-a** > Ch **-a**, Mo **-a**

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[19] Note that this correspondence ignores the presence of word-final glottal stops, which Coupe analyzes as a prosodic feature in Mongsen, and whose appearance in Chungli transcriptions is provisional until further research can be conducted.

[20] This root appears briefly in HPTB without the ***s**-prefix as ***ma-t** 'exhausted / spent' (HPTB: 334: fn.18), and in STC with some supporting forms bearing glosses like 'to be lost; lose' (STC: 101: #425). See also Yu 2009: 11: #39.

This development of *-a > -a involves a merger with *-a(ː)y, which also became -a in Ao (see §2.1.10). The Ao forms for NEGATIVE could also be classified under *-a(ː)y > -a if they are considered to reflect the allofam with a palatal suffix (*may).[21]

The two Chungli forms for LOSE / DISAPPEAR appear to be the relic of a pair involving the *s- verb prefix, which was "directive, causative, or intensive" in PTB (STC: 105; see also HPTB: §4.2.1) but is no longer productive in Ao. The final glottal stops in the forms of both dialects may be the remnant of suffixal *-t (though see (108) HEAVY for a reflex that preserves *-t).[22]

The Ao reflexes meaning 'ear' both parallel Proto-Tani *ña-ruŋ EAR, where *ruŋ may mean 'hole / dent' (Sun 1993: 190).

The PTB root for the 2ND PERSON PRONOUN has two allofams, *na ⋇ *naŋ, the first of which is reflected in the Chungli form na². (See also Table 13 in §2.1.5).

In some environments, PTB *-a has developed into Chungli -u while (mostly) remaining -a in Mongsen:

	Proto-Gloss	*PTB*	*Chungli*	*Mongsen*
(7)	BIRD	*wa	u̠¹zə¹	wàzà̱ʔ
(8)	GO	*s-wa	a-u²	wa
(9)	TOOTH†	*p-wa	tə²-pu²	[tə]-pha
(10)	HAIR†	*s-pwa-t		phìɹùwà̠ 'hair of body'
(11)	BAMBOO	*g/r-pʷa	au³¹	[a]-hwá̱ʔ, [a]-u
(12)	FATHER	*pʷa	tə²-puʔ²	[tə]-paʔ
(13)	AXE	*r-pʷa	pu¹	[a]-u
(14)	SEARCH FOR	*pa	pu̠²si²	p̠asi
(15)	FIVE	*l/b-ŋa	pu¹ŋu²	phaŋa
(16)	FISH	*s-ŋya	a³ŋuʔ¹	[a]-hŋáʔ
(17)	BITTER	*b-ka-n	a³-kuʔ¹	kháʔ
(18)	OPEN / MOUTH	*m-ka	a³-ka¹ 'gape'	ka 'open mouth'
(19)	COME†	*la ⋇ *ra	a³ɹu¹	ɹà

Table 6: *-a > Ch -u, Mo -a

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[21] See HPTB: 488-9.
[22] The transcription of glottal stops in the Chungli forms here can be considered relatively reliable since they are corroborated by Weidert 1987 ³a³maʔ 'forget' (285: #710) and ³sa¹maʔ 'lose' (307: #808).

The Chungli reflexes of BIRD, GO, and TOOTH show that PTB ***-a** > **-u** when preceded by the initial consonant ***w-**. In the Mongsen reflexes, ***wa** remained **wa** (except for **[tə]-pha** 'tooth', in which the prefix has preempted the weak root-initial). HAIR is included here because the Mongsen form shows ***-wa** > **-wa** (with ***-w-** as a medial glide instead of a root-initial consonant), and thus the Chungli reflex, if it exists, would likely show ***-wa** > **-u**.

The PTB roots for BAMBOO, FATHER, and AXE all contain 'extrusional' ***pʷ-** (Matisoff 2000). Chungli **tə²-puʔ²** 'father' and **pu¹** 'axe' seem to have developed from ***pʷa** after phonologization of the exudate (***pa** > **pʷa** > ***pwa** > **pu**), while **au³¹** 'bamboo' (which contains a fossilized non-relational prefix **a-**) arose from prefix loss (***pa** > **pʷa** > ***pwa** > ***p-wa** > ***-wa** > **u**) (see Matisoff 2000: 180 for the stages of extrusion).[23]

The Mongsen reflexes of these three roots are somewhat more complex. In PTB ***pʷa** FATHER, either the phonologized ***pw** cluster was simplified in favor of ***p**, or the ***pw** cluster underwent prefixization to ***p-w** and the prefix then preempted the root-initial (as in TOOTH), yielding Mongsen **[tə]-paʔ** 'father'. The cases of BAMBOO and AXE are complicated by the existence of two possible reflexes for BAMBOO, which refer to different species of bamboo. The form **[a]-hwá̰ʔ** is more consistent with the sound correspondences proposed here for Mongsen; however, the candidacy of **[a]-u** as the proper reflex of PTB ***g/r-pʷa** BAMBOO is strengthened by the fact that it is homophonous with the Mongsen form for 'axe', which descended from a nearly identical root (***r-pʷa**). In any case, Mongsen **[a]-u** appears to have participated in the ***wa** > **u** sound change proposed for Chungli: a puzzling matter which is unexplainable at the moment.[24]

SEARCH FOR is the sole example of PTB ***pa** collected so far. Although it is conceivable that it represents a sound change of ***pa** > Chungli **pu**, the Chungli and Mongsen reflexes suggest a reconstruction like ***pʷa**. Since only a small number of forms support PTB ***pa** (see HPTB: 24), ***pʷa** may indeed be a viable candidate for the reconstruction of SEARCH FOR.[25]

FIVE, FISH, and BITTER demonstrate that the open rime ***-a** remained **-a** in Mongsen but became **-u** in Chungli when preceded by a PTB velar initial, regardless of an intervening palatal glide (as in ***s-ŋya** FISH).[26] Chungli **a³-ka¹** 'gape' appears to contradict this sound change, but may be a loan from Mongsen.

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[23] The glottal stop transcribed in the Chungli form for 'father' is corroborated by Weidert 1987 **³tɯ³puʔ** (51: #121), which suggests the loss of some proto-suffix.

[24] Mongsen **[a]-u** 'bamboo' may be a loan from Chungli, but this still leaves the origin of **[a]-u** 'axe' unexplained.

[25] The second syllable of 'search for' in both Chungli and Mongsen is likely the fossilized reflex of a Proto-Ao verb suffix, since **-si** [ʃi] is an aspectual suffix that "may imply some repetition of the act of the primary" in Chungli (Clark 1911: 692), but not in Mongsen.

[26] This mirrors a sound change that occurred in Old Chinese, where OC **-o** corresponds to TB ***-a** after velars (STC: 186).

Lack of data requires the explanation of COME to enter the realm of speculation. The Mongsen form reflects the PTB root perfectly, while the development of ***-a** > Chungli **-u** here may have been influenced by a rounded or uvular quality of PTB ***r**. More cannot be said at this time.

When the PTB root-initial consonant was a sibilant,[27] PTB ***-a** remained **-a** in Mongsen but became **-i** in Chungli:

	Proto-Gloss	*PTB*	*Chungli*	*Mongsen*
(20)	RICE	*dzya	tʃi¹	[a]-tʃa
(21)	EAT	*dzya-k	a²-tʃiʔ²	tʃàʔ
(22)	VAGINA	*tsya	tə³-tʃi¹	
(23)	HOT / HURT / PAIN	*tsa-t	a²-si² 'be painful'	tʃha 'be hot'
(24)	MEAT / ANIMAL	*sya-n	siʔ¹ 'meat'	[a]-sáʔ 'meat'
			s̲i̲²ɹu³ɹu¹ 'animal'	s̲à̲ɹàɹə 'animal'
(25)	NOSE	*s-na	tə²-niʔ²	[tə]-naʔ

Table 7: ***-a** > Ch **-i**, Mo **-a**

Chungli **tə²-niʔ²** 'nose' is the only anomalous form in Table 7, though perhaps the ***s-** prefix in ***s-na** NOSE was responsible for palatalization of ***n-** to pre-Chungli ***ny-** (***ɲ-**), as in Lepcha (Benedict 1943). The palatal initial would have then conditioned the ***-a** > **-i** change seen in the Chungli form. Therefore, if the palatal [ʃ] (as in the Chungli reflexes of HOT / HURT / PAIN and MEAT / ANIMAL) had been a distinct phoneme /ʃ/ at the pre-Chungli stage (rather than an allophone of /s/), the sound changes in Table 7 could be united under the following description: pre-Chungli ***-a** > Chungli **-i** after a palatal initial.

Finally, a few other sets show PTB ***-a** > **-ə**:

	Proto-Gloss	*PTB*	*Chungli*	*Mongsen*
(3)	NEGATIVE	*ma-y	mə²- (negative)	mə̀- (negative)
(26)	NEGATIVE IMPERATIVE	*ta	tə¹-	tə̀-
(27)	FALL	*kla-k/y/t	(tsək³¹)	atsə

Table 8: ***-a** > **-ə**

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[27] The class of sibilants is here assumed to include the affricates [**ts**] and [**tʃ**].

The Chungli and Mongsen reflexes of NEGATIVE and NEGATIVE IMPERATIVE here contain vocalic nuclei which have undergone reduction to merge with /ə/, presumably as a result of their status as unstressed verbal prefixes.

Mongsen **atsə** 'fall' likely reflects the un-suffixed allofam ***kla** FALL, with a ***kl-** > Proto-Ao ***ts-** development (cf. (109) EXCREMENT) followed by the merger of all vowels to **-ə** following the root-initial **ts(h)-** (the Proto-Ao schwa-merger). (See §2.1.2 for a treatment of the Chungli reflex.)

2.1.2. *-(y)ak > -ak; *-wak > -uk

The regular reflex of PTB ***-(y)ak** is **-ak** in both dialects of Ao:

	Proto-Gloss	*PTB*	*Chungli*	*Mongsen*
(28)	CHEW[†]	*(N/s)-ĭak	mə²tʃak²	mətʃak
(29)	FACE[†]	*cak	tə²-tʃak²	
(30)	SCRATCH	*hyak	a³nak¹	hnàk
(31)	LICK	*m/s-lyak	mə²nak²	məlak
(32)	ITCH	*m-sak	mə³sak¹	məsak
(33)	WEAVE	*tak	a²-tak²	tàk
(34)	BLACK	*s-nak	a³-nak¹	nák
(35)	LEAF	*r-pak	a²-pak² 'be flat'	apak 'be flat'
(36)	ASHAMED	*g-yak	ak³¹	ahjak
(37)	BREATH(E)	*r-sak	<u>sa²</u>si² 'breathe'	[tə]-saka 'breath'
(27)	FALL	*kla-k/y/t	tsək³¹	(atsə)

*Table 9: *-(y)ak > -ak*

As evidenced by the number of cognate sets, this is a very robust correspondence. The only anomalous forms are the Chungli reflexes of BREATH(E) and FALL. In Chungli **sa²si²** 'breathe', the final ***-k** was most likely absorbed by the second syllable, which appears to be the same lexical suffix as in (14) SEARCH FOR (see footnote 25).[28] Chungli **tsək³¹** 'fall' reflects the suffixed allofam ***klak** FALL, with a ***kl-** > Proto-Ao ***ts-** development[29] followed by the Proto-Ao schwa-merger, yielding **tsək** in Chungli.

Where PTB ***-ak** was preceded by **w**, both dialects participated in a ***a > u** development to yield **-uk**:

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[28] According to Clark, however, **sa** is the "stem of words meaning to breathe" throughout Chungli (1911: 630), so the loss of final ***-k** extends beyond this form and may require a different explanation.

[29] Though see (109) EXCREMENT for a possible PTB *kl- > Proto-Ao *ts- > Chungli **s-** development.

	Proto-Gloss	PTB	Chungli	Mongsen
(38)	BRAIN†	*s/k-lwak	tu²-ku³luk¹	[tə]-kuluk
(39)	SWEEP	*py(w)ak	a³-uk¹	ùk
(40)	COME OUT	*s-twak	a³tuk¹	
(41)	PIG	*pʷak	ak³¹	[a]-úk

*Table 10: *-wak > -uk*

Mongsen did not participate in the open-syllable development of PTB **wa** > **u** in Chungli (Table 6), but joins Chungli here in ***-wak** > **-uk**.

The Mongsen reflex of PIG demonstrates that extrusion did occur, which makes the Chungli form extremely puzzling in its failure to show PTB ***wak** > **uk**, though perhaps it is a loanword.

2.1.3. *-am > -əm

Another robust development in both dialects is PTB ***-am** > **-əm**:[30]

	Proto-Gloss	PTB	Chungli	Mongsen
(42)	FATHOM[31]	*la(:)m	a²nəm²	ahnəm
(43)	FLY (V.)	*byam	a²-jəm²	jim
(44)	CHIN	*gam	tə²-kəm²	
(45)	GOOD	*s-nam	a²nəm² 'be well'	nəm 'be satisfied'
(46)	SMELL	*m/s-nam	mə²nəm²	məhnəm
(47)	HOLD IN MOUTH†	*ŋam	ma²ŋəm²	
(48)	OTTER[32]	*s-ram	si¹ɹəm²	siɹəm
(49)	JUNGLE / FOREST	*ram	a¹ɹəm²	
(50)	HAIR (HEAD)	*sam	paŋ³s<u>əm</u>¹ 'beard'	

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[30] Note that this represents a merger with PTB ***-um** and ***-im**, which also became **-əm**.

[31] Clark gives the Chungli reflex of FATHOM as AM (1911: 53), which may be a reduced form derived from **anəm**.

[32] This root has some intriguing complications: Clark gives Chungli SHI-IM as 'otter' (1911: 694) and SHIREM as 'an otter probably' (1911: 703). My Chungli consultant, however, cannot remember the word for 'otter' (but thinks it might be **sim¹²** [ʃim¹²]) and translates **si¹ɹəm²** [ʃi¹ɹəm²] as 'bear' (which is corroborated by *shirem* 'bear' in Kumar 1971: 71). For 'bear', however, Clark gives SHIM (1911: 696), which is very similar to SHI-IM 'otter'. Weidert has 'otter' as **³ʃi¹m** (1987: 122: #229). Meanwhile, Mongsen has **siɹəm** for 'otter' and the suspiciously-similar **iɹəm** for 'bear' (Coupe 2007). Perhaps some sort of bear-otter semantic flip-flop has taken place in Chungli since the early 1900s.

	Proto-Gloss	PTB	Chungli	Mongsen
(51)	ROAD	*lam	lən¹ 'path' -lən (loc.)	

*Table 11: *-am > -əm*

Either a diachronic or synchronic explanation can account for the **-i-** vowel in Mongsen **jim** 'fly'. Both involve Coupe's observation that Mongsen schwa occupies the "weakest articulatory position in the vowel phoneme inventory and often assimilates in height, backness and rounding to adjacent glides in word formation processes" (2007: 45). The diachronic account posits the development of PTB ***byam** > Proto-Ao ***-yəm** (=[jəm]) > Mongsen **jim**, treating the assimilation of schwa to a preceding palatal glide as a historical process. In the synchronic account, Mongsen 'fly' is underlying /jəm/, which surfaces as [**jim**] due to coarticulation. In the Chungli reflex of FLY, the presence of an underlying schwa is revealed by the pronunciation of the verb root as [**jɪm**], indicating that the Chungli form is underlying /**a-jəm**/, not /**a-jim**/. Evidence that this may also be the case in Mongsen comes from the fact that Marrison gives 'to fly' as **yem** (1967: II: 100), apparently from Mills' impressionistic romanizations of Longchang Mongsen (Coupe 2007: 29). This observation suggests that what Coupe transcribes as **i** in Mongsen **jim** 'fly' may actually be phonetically lower than [**i**], supporting the idea that this form contains underlying /ə/.

The first syllable of Chungli **paŋ³səm¹** 'beard' means 'mouth' (see (59) below).

The Chungli reflexes of ROAD are **lən¹** 'path' and **-lən**, a locative nominalizer meaning 'toward' or 'direction', as in **tə³tʃak³-lən¹** 'front' (face-direction) and **a¹nə²-lu²-lən³** 'west' (sun-go.down-direction). The appearance of final **-n** here is unexpected, however, especially given the development of ***la(ː)m** > Chungli **a²nəm²** (with final **-m**) for FATHOM.

2.1.4. *-(y)an > -ən

Table 12 illustrates the regular development of PTB ***-(y)an** > **-ən** in both dialects.[33]

	Proto-Gloss	PTB	Chungli	Mongsen
(52)	EVIL	*na-n	mə²nən² 'be dirty'	mənən 'be dirty'
(53)	SIT†	*myan	a³-mən¹	mən
(54)	CURRY	*h(y)an	aun²	əntʃhu

*Table 12: *-(y)an > -ən*

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[33] This constitutes a merger with PTB ***-in**, ***-en**, ***-a(ː)r**, and ***-uːr** > **-ən**.

Chungli 'curry' appears to bear a fossilized non-relational prefix, making **un** the actual reflex of PTB CURRY. The development of **un** here instead of **ən** is unusual, though it would be consistent with a reconstruction containing a medial labiovelar glide, i.e. *__hwan__. However, Clark provides alternate pronunciations of 'curry' as [**ain**] and [**an**] (1911: 18), indicating that this form has more complications yet to be explained.

Note that the reconstruction of the medial palatal glide in SIT is supported by only one form in the STEDT database, suggesting that this root could be reconstructed as *__m(y)an__ (i.e. *__myan__ ⋊ *__man__).

2.1.5. *__-aŋ__ > __-aŋ/-uŋ__

PTB *__-aŋ__ > __-aŋ__ is strongly attested in both dialects of Ao:

	Proto-Gloss	PTB	Chungli	Mongsen
(55)	CORPSE	*s-maŋ	tə²-maŋ² 'body'	[a]-maŋ
(56)	DREAM	*r/s-maŋ	puŋ²man²	aja-maŋ
(57)	LIZARD	*r-saŋ	saŋ²kən²	sàŋphila
(58)	STRENGTH†	*(k/b)-ra(ŋ/m)	mə²ɹaŋ² 'be hard' / 'iron'	məɹaŋ 'be hard'
(59)	MOUTH†	*p(r)(w)aŋ	tə²-paŋ²	[tə]-paŋ
(60)	CLEAR	*(t)syaŋ	tʃaŋ²tʃa²	tʃàŋtʃà
(61)	TESTICLE	*tsyaŋ	tʃaŋ² 'seed'	tʃaŋ 'seed'
(62)	SEE	*mraŋ	ɹəp²ɹaŋ²	
(63)	HIGH / LONG	*m-raŋ	a³-laŋ¹	hláŋ
(64)	BLACK / INK	*s-maŋ	a³-maŋ¹ 'be dark'	màŋ 'be dark'
(6)	2ND PERSON PRONOUN	*na-ŋ	(na²)	nàŋ
(65)	BE DRY	*ka(:)ŋ	a²-kuŋ² 'be dry' mu²kuŋ² 'be cold'	kuŋ 'be dry' məkuŋ 'be cold'
(66)	RUST	*g/b-syaŋ	suŋ²	[a]-tshəŋ
(67)	COUNT	*kraŋ ⋊ *graŋ	a³-zəŋ¹ 'read'	zə̀ŋ 'read / count'
(68)	FOOT / LEG	*r-kaŋ	tə²-tsəŋ²	[tə]-tʃaŋ

*Table 13: *-(y)aŋ > -aŋ/-uŋ*

Chungli **a²-kuŋ²** and Mongsen **kuŋ** (both 'be dry') reveal that *__-aŋ__ became __-uŋ__ after velar initials in both dialects, as occurred in Chungli with the open rime *__-a__ (cf. Table 6 in §2.1.1).

The forms meaning 'be cold' are included under the same BE DRY root as possible combinations of the negative prefix **mə-** (with vowel harmony in Chungli) and 'dry'. Clark defines Chungli TEMOKONG[34] as "disagreeable to the touch as a thing that is clammy, cold, or very dirty" (1911: 461), which suggests that it formerly meant 'not dry.'[35]

Chungli **suŋ²** 'rust' is problematic, while the nucleus of the Mongsen cognate **[a]-tshəŋ** shows the expected result of the Proto-Ao schwa-merger. The appearance of schwa in Mongsen **zə̀ŋ** 'read / count' is also unexpected, since the sequence /**zaŋ**/ is phonotactically acceptable in Mongsen. Chungli **a³-zəŋ¹** 'read', on the other hand, finds its explanation in the merger of all vowels to schwa following pre-Chungli ***z-**.

Mongsen **[tə]-tʃaŋ** 'foot / leg' seems to reflect a variant of PTB ***r-kaŋ**, namely ***k-raŋ**, following the ***kr-** > Proto-Ao **tʃ-** development seen in (69) WEEP below. The Chungli reflex **tə²-tsəŋ²** is peculiar, however, because the vowel nucleus appears to have developed into schwa following **ts-**, but **after** the Proto-Ao stage. Perhaps there were two variants of 'foot / leg' in Proto-Ao, namely ***tʃaŋ** ⋊ ***tsaŋ**, with the Chungli cognate reflecting the latter variant after it underwent the Proto-Ao schwa-merger (**V > ə / ts(h)__**) to yield **tsəŋ**.

2.1.6. *-a(ː)p > -əp

PTB ***-a(ː)p** became **-əp** in both dialects, illustrated below:

	Proto-Gloss	PTB	Chungli	Mongsen
(69)	WEEP	*krap	a²-tʃəp²	tʃə̀p
(70)	SNOT	*s-nap	nəp¹	
(71)	SHOOT	*gaːp		kə̀p

*Table 14: *-a(ː)p > -əp*

This involves a merger with PTB ***-ep** and ***-up**, which both became **-əp** in Chungli and Mongsen.

2.1.7. *-a(ː)r > -ən

The PTB rime ***-a(ː)r** regularly became **-ən** in both dialects:[36]

	Proto-Gloss	PTB	Chungli	Mongsen
(72)	SING	*gaːr	kən¹ 'song'	

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[34] The **tə-** in Chungli TEMOKONG (**tə²-mu²kuŋ²**) derives an adjective from a stative verb.
[35] Note that Clark interprets MOKONG as a combination of 'not' and 'touch' (from KONG-SHI), but this seems a very unlikely etymology.
[36] This is a merger with PTB ***-(y)an**, ***-en**, ***-in**, and ***-uːr** > **-ən**.

	Proto-Gloss	PTB	Chungli	Mongsen
(73)	NEW	*sar	ta²sən²	sən
(74)	CHICKEN	*haːr	an² 'chicken' ən²tsə² 'egg'	[a]-hən 'chicken' həntsə 'egg'
(75)	THROW (AWAY)	*hʷar	ən²tuk² 'throw away' a-un² 'throw at'	həntʃuk 'throw away'

Table 15: *-a(ː)r > -ən

See §2.3.7 (PTB ***-uːr** > **-ən**) for another example of the proto-coda ***-r** becoming final **-n**.

Note that Chungli **kən¹** 'song' fits well with the regular sound change proposed here, but could be a loan from Nagamese/Assamese **gān** 'poem, anthem' (Boruah 1993: 104).

The preservation of ***-a-** in Chungli monosyllabic **an²** 'chicken' but not in disyllabic **ən²tsə²** 'egg'[37] suggests the possibility that PTB ***haːr** CHICKEN first became Proto-Ao ***han** (PTB ***-r** > Proto-Ao ***-n**), which then lost initial ***h-** in pre-Chungli. The rime ***-an** was then phonologically reduced to **-ən** in both dialects (a parallel innovation), except where it was the sole constituent of an onset-less monosyllabic word (e.g. Chungli **an²** 'chicken') and therefore resisted reduction. Alternatively, **han** and **an** could have both existed as allofamic variants in Proto-Ao before the Chungli-Mongsen split, with **han** then undergoing ***-an** > **-ən** in Proto-Ao but **an** resisting this reduction.

The labio-laryngeal initial (cf. HPTB: 55) in ***hʷar** THROW (AWAY) conditioned the characteristic Chungli development of **u** in the nucleus in the following chain of sound changes: PTB ***hʷar** > Proto-Ao ***hʷan** > pre-Chungli ***wan** > Chungli **un** (assuming that Proto-Ao ***-ʷan** did not participate in ***-an** > **-ən**). It is difficult to say whether Mongsen also participated in the rounding development, as the reflexes of ***hʷar** in both Mongsen **həntʃuk** 'throw away' and Chungli **ən²tuk²** 'throw away'[38] appear to contain a phonologically-reduced vowel.

2.1.8. *-(y)at > -ət

A few forms suggest PTB ***-(y)at** > Ao **-ət**:[39]

	Proto-Gloss	PTB	Chungli	Mongsen
(76)	ONE	*k-(y)at	ka¹	akhət ~ akhəta

---

[37] The initial schwa in Chungli 'egg' is not simply a phonetically-reduced /**a**/: my consultant produces [**ə**] even in slow speech.

[38] Clark (Mrs. E.W.) describes **-tuk** ('dok') in Chungli as a verbal suffix meaning "away, off, getting rid of something not wanted" (1893: 27).

[39] This is a merger with PTB ***-is**, ***-iːt**, ***-us**, and ***-ut** > **-ət**.

	Proto-Gloss	PTB	Chungli	Mongsen
(77)	EIGHT[40]	PKN *d-ryat	ti²	tshət
(78)	KILL	*g/b-sat	təp³sə̱t¹	təp-sə̱̀t

*Table 16: ***-at** > **-ət***

The often-eccentric behavior of TB numerals has resulted in much toil on the part of scholars (cf. Matisoff 1995). Suffice it to say that, while Mongsen **akhət ~ akhəta** 'one' nicely reflects the PTB reconstruction, the Chungli reflex may have descended from a different root. Also, Chungli **ti²** 'eight' appears to be the result of prefix preemption which has obliterated the root-initial (see HPTB: 153) or possibly even the whole root itself.

2.1.9. ***-a(ː)w** > **-u**

In a development parallel to ***wa** > Chungli **u**, the PTB diphthong ***-a(ː)w** became **-u** in both dialects:

	Proto-Gloss	PTB	Chungli	Mongsen
(79)	YOUNGER SIBLING	*naːw	tə²-nu²	[tə]-nu
(80)	HEAD	*m/s-gaw	tu²-ku̱²lak² 'head'	
			ku̱²ɹaŋ² 'hat'	kù̱hɹàŋ 'hat'
(81)	BASKET	*kaw	ku²	aku

*Table 17: ***-a(ː)w** > **-u***

This represents a merger with PTB ***-əw**, ***-u**, and ***-ow** > **-u**.

2.1.10. ***-a(ː)y** > **-a**

The regular reflex of the PTB diphthong ***-a(ː)y** is Ao **-a** (merging with PTB ***-a** > **-a** in most environments):

	Proto-Gloss	PTB	Chungli	Mongsen
(82)	NAVEL	*m-la(ː)y	tə²-pə²la²	[tə]-phəla
(83)	FACE	*s-maːy		[tə]-ma
(84)	PUMPKIN *see also (144)*	*maːy	ma̱³puʔ¹	má̱phúʔ
(85)	NEAR	*s-naːy	a³na¹	áhná

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[40] This reconstruction is presented in STC as belonging to the hypothesized 'Kuki-Naga' proto-language (STC: 45: fn.148; see also Matisoff 1995: 204), differing from the PTB form (***b-g-ryat**) only in its prefix.

	Proto-Gloss	PTB	Chungli	Mongsen
(86)	CHIN	*m-ka-y		[tə]-mə́khá?
(87)	SPLEEN	*r-pay	tə^2-pa^2	
(88)	PUS	*s-naːy		a<u>hna</u>-tsə
(89)	PLAY	*r-tsyaːy	a^{2}sai^{2}ja^2 'play' sai^{31} (short form)	tʃhaj 'played' asaja 'jested'
(90)	YAM	*m-n(w)ay	nə^1 'taro'	[a]-mi
(91)	1ST PERSON PRONOUN	*ŋa-y	ni^2	nì

Table 18: *-a(ː)y > -a

Perhaps owing to the initial palatal affricate, PLAY has retained the diphthong (with a palatal offglide) in both dialects.

Little conclusive can be said about YAM, though it may indicate a PTB *-**way** > Chungli -**ə**, Mongsen -**i** development. Prefix preemption has evidently occurred in the Mongsen reflex, with ***m-** displacing the root-initial.

The reflexes of the 1ST PERSON PRONOUN suggest that PTB *-**ay** > Proto-Ao *-**i** after a PTB velar nasal, which then apicalized to **n-** for some unknown reason. However, additional data is needed to confirm this development.

2.2. *Front vowels:* *-e-, *-ə-, *-i-

2.2.1. *-**en** > Chungli -**ən**; *-**ep** > -**əp**

If the correspondences shown by these two cognate sets are found to be regular, then PTB *-**en** > Chungli -**ən** and PTB *-**ep** > -**əp** in both dialects:

	Proto-Gloss	PTB	Chungli	Mongsen
(92)	HIPS†	*pen	tə^2-pən^2 'tail'	
(93)	SLICE	*s-lep	a^3-ləp^1	lə̀p

Table 19: *-en > -ən; *-ep > -əp

PTB *-**en** > Chungli -**ən** involves a merger with *-**(y)an**, *-**a(ː)r**, *-**in**, and *-**u(ː)r**, all of which became -**ən** in both dialects. PTB *-**ep** > Ao -**əp** is a merger with *-**a(ː)p** and *-**up** > -**əp**.

2.2.2. *-ey > -i

The regular reflex of the PTB diphthong ***-ey** in both dialects is **-i** (a merger with ***-i**):

	Proto-Gloss	PTB	Chungli	Mongsen
(94)	TONGUE[41]	*m-ley	tə²-mə²li²	[tə]-məli
(95)	BUY	*r-ley	a³li?¹	hlì
(96)	TAIL	*r-mey		[tə]-mi
(97)	FIRE	*mey	mi?¹	mi
(98)	KNOW	*syey-s	a³-si?¹	si
(99)	GROUND / EARTH	*m-ley	a²li²	[a]-lí
(100)	PASS	*s-ley	səi³¹ 'pass'	səj 'cross over, pass' hì? 'pass by'

Table 20: *-ey > -i

The cognate set PASS appears to reflect a development in which the PTB initial ***l-** was spirantized and devoiced to a lateral fricative ***ɬ-** (perhaps through the influence of the ***s-** prefix, cf. HPTB: §4.2), yielding Proto-Ao ***s-ɬi**. Proto-Ao ***ɬ-** was then debuccalized to **h-** in Mongsen **hì?** but lost completely in Chungli **səi³¹** and Mongsen **səj** (which still reflect the ***s-** prefix).[42]

2.2.3. *-(w)əy > Chungli -ə, Mongsen -i/-ə

The reflex of the PTB diphthong ***-(w)əy** is Chungli **-ə** in all environments. In Mongsen, however, ***-(w)əy > -i**, except where it became **-ə** when preceded by a Proto-Ao dental sibilant (EXCREMENT, WRITE, DIE):[43]

	Proto-Gloss	PTB	Chungli	Mongsen
(101)	BLOOD	*s-hywəy	a³zə?¹	[a]-jí?
(102)	DOG	*d-kʷəy-n	a³zə¹	[a]-ji
(103)	FLEA[44]	*s-ləy	a¹zə̲²puŋ²	[a]-hli
(104)	FOUR	*b-ləy	pə¹zə²	phəli

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[41] This reconstruction is an amalgamation of ***m/s-lay** and ***-ley** from HPTB: 511.

[42] The segment analyzed by Coupe as a final palatal glide in Mongsen **səj** 'cross over, pass' constitutes the reflex of ***-ey** here.

[43] PTB ***-(w)əy** therefore merged with ***-i** and ***-ey** in Mongsen but was kept distinct in Chungli.

[44] Clark interprets Chungli AZY̲-BONG (**a¹zə̲²puŋ²**) 'flea' as a compound meaning 'dog-hopper' (1911: 203), but this is likely a folk etymology.

	Proto-Gloss	PTB	Chungli	Mongsen
(105)	SUN / DAY	*nəy	kə²nə² 'one day' a¹nə² 'sun'	níʔ 'one day'
(106)	LAUGH [45]	*m-nwi(y)-k	mə²nə²	məni
(107)	COMB	*m-si(y)	mə³sə¹	
(108)	HEAVY	*s-rəy-t	ta-ɹət	
(109)	EXCREMENT	*kləy	səʔ¹	[a]-tsə́ʔ
(110)	WRITE	*b-rəy	z̲ə³lu¹	z̲əlu
(111)	DIE	*səy	a²-sə²	sə
(112)	TIGER	*d-kəy	k̲ə¹ji¹	[a]-khu

*Table 21: *-(w)əy > Ch -ə, Mo -i/-ə*

The only anomalous form here is Mongsen **[a]-khu** 'tiger', which shows ***-(w)əy >
-u** instead of **-i** (possibly due to the velar initial).

One potential cognate excluded from this list is Chungli **mu²zə²** 'medicine', which
appears to descend from PTB ***r-tsəy** MEDICINE. The Mongsen form for 'medicine',
however, is **mul̲i**. Based on the reflexes of FOUR and FLEA, Mongsen **(h)li** corresponds to
PTB ***ləy**, and thus the appropriate MEDICINE etymon for the Ao forms should contain
*l-, which rules out ***r-tsəy**.[46]

2.2.4. *-i > -i/-ə

Table 22 lists the Ao reflexes of forms with PTB ***-i**:

	Proto-Gloss	PTB	Chungli	Mongsen
(113)	WAIST / LOINS†	*d/s-p(y)i	tə³-pi¹ 'thigh'	[tə]-phi 'thigh'
(114)	PERSON	*r-mi(y)-n	n̲i²suŋ² 'person' m̲im³¹tʃiɹ¹ 'humankind'	[a]-miʔ 'person' m̲i-jim-tʃàɹ 'humankind'
(115)	COPULA / BE[47]	*s-ri(y)-t	a²-li²	li
(116)	SEVEN	*s-ni-s	(tə²nət²)	thəni
(117)	TWO	*g-ni-s/k	a¹na¹	(anət)

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[45] The sequence **i(y)** in a PTB reconstruction (as in LAUGH and COMB) indicates allofamic variation
between ***i** and ***əy** (HPTB: 509).

[46] Jim Matisoff (p.c., 18 May 2010) has suggested the possibility that a metathesized variant of PTB
MEDICINE developed as follows: ****tsrəy > srəy > sli > hli**.

[47] French reconstructs BE as ***ley** for Proto-Northern Naga (1983: 454). If ***ley** were reconstructed at the
PTB level, the Ao reflexes of BE in (115) *p*hould fit perfectly into PTB ***-ey > -i** (§2.2.2).

	Proto-Gloss	PTB	Chungli	Mongsen
(118)	SALT	*m-t(s)i	mə²tsə²	mətsə

Table 22: *-i > -i/-ə

The cognate sets WAIST / LOINS, PERSON, and COPULA / BE, along with Mongsen **thəni** 'seven', appear to indicate that the regular reflex of PTB ***-i** is **-i** in both dialects.[48] The appearance of **-a** in Chungli **a¹na¹** 'two' is unexplainable at present. (See §2.2.8 for the treatment of Chungli **tə²nət²** 'seven' and Mongsen **anət** 'two', which are reflexes of the ***s**-suffixed allofams.).

The Chungli and Mongsen cognates meaning 'salt' reflect the Proto-Ao schwa-merger.

2.2.5. *-ik > Chungli -ək, Mongsen -ik/-ək

Paralleling the development of PTB ***-(w)əy** (§2.2.3), the regular reflex of PTB ***-ik** is Chungli **-ək** but Mongsen **-ik**:

	Proto-Gloss	PTB	Chungli	Mongsen
(119)	EYE	*s-mik	tə²-nək²	[tə]-nik
(120)	LOUSE	*s-r(y)ik	a³tsək¹	[a]-tshək
(121)	PINCH	*sik	mə³tsək¹	mətshək
(122)	LEOPARD	*g-zik	si²tsək² 'wild cat'	

Table 23: *-ik > Chungli -ək, Mongsen -ik/ək

EYE is essentially the only cognate set that reveals this development, since the **-ək** rimes in LOUSE, PINCH, and LEOPARD are the result of the Proto-Ao schwa-merger following ***ts(h)-**.

2.2.6. *-il; *-(y)im; *-in > -ən

Table 24 illustrates the reflexes of PTB ***-il**, ***-(y)im**, and ***-in**:

	Proto-Gloss	PTB	Chungli	Mongsen
(123)	SPITTLE	*m-ts(y)il	mə²tsə²	mətsə
(124)	DISTRIBUTE	*b-rim	a²-ləm²	ləm 'divide'
(125)	HOUSE	*k-yim	ki¹	[a]-ki

---

[48] Mongsen shows a merger of PTB ***-(w)əy** and ***-i** here.

	Proto-Gloss	PTB	Chungli	Mongsen
(126)	LIVER	*m-sin	$tə^3$-$mə^3sən^1$	[tə]-məsən
(127)	RIPE	*s-min	a^2-$mən^2$	hniŋ

*Table 24: ***-il**; ***-(y)im**; ***-in** > ***ə**n*

Since the reflexes of SPITTLE contain a dental affricate, which can only be followed by schwa in Ao, it is impossible to determine the regular reflex of PTB *-il from this form.

DISTRIBUTE suggests *-im > -əm, while the loss of final -m and preservation of -i in both Ao reflexes of HOUSE is quite peculiar. A quick survey of forms from some other languages in Nagaland reveals that this phenomenon is widespread (though not in the Northern Naga group; cf. PNN *kium HOUSE [French 1983: 505]): Angami [5]ki, Lotha [1]o[1]gi (Weidert 1987: 108-9: #196), Yacham-Tengsa ki, Khezha ekie, Sumi (Sema) aki, Zeme heki, Mzieme ki (Marrison 1967: II: 128), all 'house'.

LIVER and RIPE reveal that PTB *-in > Ao -ən (which is a merger with *-(y)an, *-a(ː)r, *-en, and *-uːr > -ən). Mongsen hniŋ 'be ripe' most likely reflects an allofam with a velar final, namely *s-miŋ (cf. the Mongsen reflex in (128) NAME below).

2.2.7. *-iŋ > Chungli -əŋ, Mongsen -iŋ/-əŋ

PTB *-iŋ > Chungli -əŋ but remained -iŋ in Mongsen, except to surface as -əŋ when preceded by a PTB dental fricative (*s-):

	Proto-Gloss	PTB	Chungli	Mongsen
(128)	NAME	*r/s-miŋ	$tə^2$-$nəŋ^2$	[tə]-niŋ
(129)	MARROW	*r-kliŋ	$tə^2$-<u>nəŋ</u>$^3la^1$	[tə]-<u>liŋ</u>la
(130)	WOOD	*siŋ	$səŋ^1$	[a]-sə́ŋ

*Table 25: ***-iŋ** > Ch **-əŋ**, Mo **-iŋ/-əŋ***

This correspondence between Chungli -əŋ and Mongsen -iŋ is also evident in the pair $a^3nəŋ^1$ and [a]-niŋ, the Chungli and Mongsen words for 'sky', respectively.[49]

2.2.8. *-iːp; *-iːt, *-is > *-it > -ət

Forms containing the reflexes of PTB *-iːp and *-iːt are presented below:

	Proto-Gloss	PTB	Chungli	Mongsen
(131)	CLOSE (V.)	*dzyiːp	a^3-$siʔ^1$	tʃhìʔ

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[49] A PTB reconstruction is not yet available for this cognate set.

	Proto-Gloss	PTB	Chungli	Mongsen
(132)	HORSE LEECH	*m-liːt	mələt (Clark MELET)	mənət 'water leech'
(133)	REAP	*riːt		zì
(116)	SEVEN	*s-ni-s	tə²nət²	(thəni)
(117)	TWO	*g-ni-s/k	(a¹na¹)	anət

Table 26: *-iːp; *-iːt, *-is > *-it > -ət

Final ***-p** has been lost in both reflexes of CLOSE, leaving a final glottal stop, while the vowel nucleus has been preserved as **-i**. At this time, it is impossible to determine whether the loss of coda ***-p** after ***-i(ː)-** was a regular development in Ao.

The reflexes of HORSE LEECH suggest the development ***-iːt > -ət** in Ao, but Mongsen **zì** 'reap' appears to have lost final ***-t** and preserved the vowel nucleus **-i**. The Chungli word for 'reap' (**a³-ru¹**) is unfortunately of no help here in determining the proper correspondence.

Chungli **tə²nət²** 'seven' and Mongsen **anət** 'two', however, provide support for the ***-i(ː)t > -ət** development: Both forms show PTB ***-s > Proto-Ao *-t** (cf. (174) BONE), which yielded ***-it** rimes at the Proto-Ao stage. Contrastive vowel length does not appear to have existed in Proto-Ao, suggesting that HORSE LEECH became ***m-lit** in Proto-Ao, after which all ***-it** rimes became **-ət** (thereby merging with the reflexes of PTB ***-(y)at**, ***-us**, and ***-ut**).

2.3. *Back vowels: *-əw-, *-u-, *-o-*

2.3.1. *-əw > -u

In a merger with ***-a(ː)w**, ***-ow**, and ***-u**, the PTB diphthong ***-əw** became **-u** in both dialects of Ao:

	Proto-Gloss	PTB	Chungli	Mongsen
(134)	SWALLOW[†][50]	*m-(l)yəw-k	mə²juk²	mi
(135)	CARRY ON BACK	*bəw	a²pu² 'carry on shoulder'	pu 'carry on shoulder' pùʔ 'carry on back'
(136)	NINE	*d/s-kəw	tu²ku²	thuku
(137)	SKY	*r-məw	mu²ku²zə² 'smoke' mu²puŋ² 'wind'	mukhuli 'smoke' məpuŋ 'wind'
(138)	SMOKE	*kəw-n/t	mu²ku²zə²	mukhuli

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[50] HPTB reconstructs SWALLOW as ***mlyəw-k** with the double glide ***-ly-** (HPTB: 81, 84).

	Proto-Gloss	PTB	Chungli	Mongsen
(139)	EAGLE / HAWK	*məw	muŋ²zə²	[a]-hmu

*Table 27: *-əw > -u*

Chungli **mə²juk²** 'swallow' preserves all the segments of the PTB root, while Mongsen **mi** appears to be a truncated form.

The Mongsen pair **pùʔ** 'carry on back' and **pu** 'carry on shoulder' may reflect the appearance *vs.* absence, respectively, of a pre-Mongsen suffix that conveyed the location of portage.

Both Ao words for 'wind' appear to reflect PTB SKY in their initial syllables, with reduction of the vowel to schwa in Mongsen **məpuŋ** 'wind'. The second syllable in both forms reflects (159) WIND, below (§2.3.5).

Chungli **muŋ²zə²** 'eagle' contains an epenthetic velar nasal, possibly from nasalization on the vowel induced by initial ***m-**.

2.3.2. *-u > -u/-ə

PTB ***-u** remained **-u** (merging with ***-a(:)w**, ***-ow**, and ***-əw**), except where it became **-ə** after the Proto-Ao schwa-merger (seen in EGG and WATER):

	Proto-Gloss	PTB	Chungli	Mongsen
(140)	BLOW†	*pu	a²-pu²	phu
(141)	GET UP / RISE	*s-tu	a³tu¹ 'come up' a²-tu² 'go up'	
(142)	DIG	*tu	a³-tuʔ¹	tùʔ
(143)	CHEST†	*s-g/k(r)u-k/s	tu³-kuʔ¹	[tə]-kùʔ
(144)	PUMPKIN *see also (84)*	PLB *pu²	ma³puʔ¹	máphúʔ
(145)	EGG	*dz(y)u	ən²tsə²	həntsə
(146)	WATER	*tsyu	tsə¹	[a]-tsə

*Table 28: *-u > -u/-ə*

If the Proto-Lolo-Burmese root ***pu²** PUMPKIN is reconstructed at the PTB level, the Ao reflexes of PUMPKIN may be compounds of two roots meaning 'pumpkin' (see (84) PUMPKIN for the first syllable).

2.3.3. *-u(:)k, *-ok > -uk

PTB ***-u(:)k** merged with ***-ok > -uk** in both dialects:

	Proto-Gloss	PTB	Chungli	Mongsen
(147)	KNEE	*m-ku(ː)k	tə²-mu³kuk¹	[tə]-məkuk
(148)	BELLY / CAVE	*puːk	ta²-puk² 'hole'	
			tə²-puk² 'belly'	[tə]-<u>puk</u> làŋ 'belly'
(149)	THUNDER	*m-bruk	tsəŋ³<u>muk</u>¹	tsəŋ<u>muk</u>
(150)	SIX	*d-ruk	tə²-ɹuk²	təɹuk
(151)	THROAT†	*k/s-ro(k/ŋ)	tə²-ɹuk²	

Table 29: *-u(ː)k, *-ok > -uk

Clark notes that the first syllable of 'thunder' in Chungli and Mongsen "seems to have an idea of divine, heavenly, or supernatural" (1911: 898) (cf. Chungli **tsəŋ¹lu¹** 'rain', **tsəŋ¹pə³ɹət¹** 'lightning', **tsəŋ²ɹəm²** 'god, deity').

2.3.4. ***-um > -əm**

PTB ***-um** merged with ***-am** and ***-im** to become **-əm** in Ao:

	Proto-Gloss	PTB	Chungli	Mongsen
(152)	MORTAR	*(t)sum	səm¹	
(153)	WARM	*s-lum ⪤ *lim	a²-ləm²	ləm
(154)	THREE	*g-sum	a¹səm²	asəm
(155)	WRAP UP	*tum	a²-təm²	
(156)	BLOCK / PILLOW	*m-kum ⪤ *m-kim	mə³kəm¹	
(157)	HEAD† 51	*l(y)am ⪤ *lum		[tə]-ləm

Table 30: *-um > -əm

Note that some of the reconstructions in Table 30 above have allofams with ***-am** or ***-im**, but the principle followed here was to group together all forms containing possible reflexes of ***-um**.

2.3.5. ***-u(ː)ŋ > -uŋ/-əŋ**

In a merger with ***-oŋ**, PTB ***-u(ː)ŋ > -uŋ** in Ao:

	Proto-Gloss	PTB	Chungli	Mongsen
(158)	CENTER	*ts(y)uːŋ	tə²-juŋ²	juŋ 'be central'

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[51] This family of reconstructions is from Matisoff 1978: 64, though ***lum** also appears in the STEDT database as HEART / ROUND.

	Proto-Gloss	PTB	Chungli	Mongsen
(159)	WIND	*buŋ	mu²p<u>uŋ</u>²	məp<u>uŋ</u>
(160)	STONE	*r-luŋ	luŋ¹	[a]-luŋ
(161)	HEART	*m-luŋ	tə²-<u>mu²luŋ</u>² tʃaŋ²	[tə]-<u>məluŋ</u>-tʃaŋ
(162)	FINGER	*m-yuŋ	tə²-mə²juŋ²	[tə]-mijuŋ
(163)	STEM	*kuːŋ	<u>kuŋ</u>²saŋ² 'branch'	<u>khuŋ</u>saŋ 'branch'
(164)	POST / COLUMN	*duːŋ	tə²-tuŋ² 'stem'	[tə]-tuŋ 'stem, trunk'
(165)	HAIR†	*(t)su-ŋ	tə²-zəŋ² 'hair of body'	

Table 31: *-u(ː)ŋ > -uŋ/-əŋ

The **-əŋ** rime in Chungli **tə²-zəŋ²** 'hair of body' is the result of the merger of all vowels to **-ə** following **z-**, which occurred in pre-Chungli.

2.3.6. *-up > -əp

PTB ***-up** merged with ***-a(ː)p** and ***-ep** to become **-əp** in both dialects:

	Proto-Gloss	PTB	Chungli	Mongsen
(166)	SUCK / KISS	*m-dzup ⋡ *m-dzip	mə³səp¹ 'suck, kiss'	mə́tʃhə́p 'suck' mətʃhəp 'kiss'
(167)	SLEEP	*s-yup ⋡ *s-yip	a³-jəp¹ 'sleep' [52] <u>jəp</u>¹tən¹ 'bed'	jip 'sleep' <u>jip</u>-tʃən 'bed'
(168)	BEAT / STRIKE	*tup	a³-təp¹	tə̀p
(169)	COVER	*gup	tə²-kəp² 'skin'	[tə]-kəp 'skin'

Table 32: *-up > -əp

As with (43) FLY (V.), the Mongsen vowel transcribed by Coupe as **i** in **jip** 'sleep' is most likely pronounced as **[ɪ]**, which would point to an underlying **/ə/** that synchronically assimilates to the adjacent palatal glide.

2.3.7. *-uːr > -ən

As with ***-a(ː)r** (§2.1.7), PTB ***-uːr > -ən** shows final ***-r > -n** in Ao:[53]

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[52] Another Chungli word for 'sleep' (which may be more common than **a³-jəp¹**) is **mə²tʃaŋ²**, apparently a loan from Karbi ('Mikir') **-mék jáng-** 'sleep' ('eye' + 'sink/fall') (Grüssner 1978: 206).

[53] PTB ***-uːr > Ao -ən** is a merger with ***-(y)an**, ***-a(ː)r**, ***-en**, and ***-in > -ən**.

	Proto-Gloss	PTB	Chungli	Mongsen
(170)	SOUR	*suːr	a³-sən¹	sə́n
(171)	WRING / SQUEEZE	*tsyuːr	a²-sən² 'twist' mə²sən² 'wring'	mətʃhən, tʃhən 'wring'

*Table 33: *-uːr > -ən*

The PTB ***-r** > Proto-Ao ***-n** development likely occurred first (along with the loss of contrastive vowel length) to yield Proto-Ao ***-un**, after which ***-un > -ən**.

2.3.8. *-u(ː)l; *-us, *-ut > -ət

Putative reflexes of PTB ***-u(ː)l**, ***-us**, and ***-ut** are illustrated in Table 34 below:

	Proto-Gloss	PTB	Chungli	Mongsen
(172)	SNAKE	*s-b/m-ruːl	pəɹ¹²	
(173)	TWENTY	*m-kul	mə²tsə²	məki
(174)	BONE	*s/m/g-rus	tə²-ɹət²	[tə]-ɹət
(175)	HAND	*k(r)u-t	tə³-ka¹	[tə]-khə́t

*Table 34: *-u(ː)l, *-us, *-ut*

In Chungli **pəɹ¹²** 'snake', the prefix ***b-** has evidently taken over the position of root-initial with loss of the rime: PTB ***s-b-ruːl** > Proto-Ao **pə-ru(ː)l** > **Chungli pəɹ**.

TWENTY is also an unusual set which may point to ***-ul > -i** in Mongsen. The appearance of **tsə** in Chungli **mə²tsə²** 'twenty' has no explanation at this time.

Mongsen **[tə]-khə́t** 'hand' and both reflexes of BONE suggest that PTB ***-us** first underwent the final/suffixal ***-s > *-t** development[54] to merge with PTB ***-ut** in Proto-Ao, after which all ***-ut** rimes became **-ət** (merging with the Ao reflexes of PTB ***-(y)at**, ***-iːt**, and ***-is**).

The Chungli reflex of HAND is unexpected, and may have descended from a separate root.

2.3.9. *-oŋ > -uŋ

PTB ***-oŋ** merged with ***-u(ː)ŋ > Ao -uŋ**:

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[54] Cf. Chungli **tə²nət²** 'seven' (from (116) PTB ***s-ni-s** SEVEN), and Mongsen **anət** 'two' (from (117) PTB ***g-ni-s/k** TWO).

	Proto-Gloss	PTB	Chungli	Mongsen
(176)	NECK[55]	*goŋ	tu²-kuŋ²	[tə]-khuŋ
(177)	BOAT	*m-loŋ	ɹuŋ²	[a]-ɹuŋ
(178)	SCROTUM	*s-bloŋ	tə²-puŋ² 'male (of animal)' [56]	

Table 35: *-oŋ > -uŋ

2.3.10. *-ow > -u

In a development paralleling ***-ey > -i**, the PTB diphthong ***-ow** became **-u** in both dialects:

	Proto-Gloss	PTB	Chungli	Mongsen
(179)	FIELD	*low	a³lu¹	[a]-hlú
(180)	NIT	*s-row	a¹ɹu²tsə²	h̲l̲u̲tsə
(181)	AWAKEN	*m-sow	mə³su¹	
(182)	BEAR (A CHILD)	*g-sow	a³-su¹	sùʔ
(183)	THORN / PIERCE	*tsow-t		[a]-tʃhu 'panji'
(184)	COOK / BOIL (V.)	*tsyow	a²-su² 'cook'	t̲ʃ̲h̲u̲ɹu 'cook'
			s̲u̲²ɹu² 'cook rice'	

Table 36: *-ow > -u

This constitutes a merger with ***-əw**, ***-u**, and ***-a(:)w > -u**.

2.3.11. *-or, *-ot

Ao forms reflecting PTB ***-or** and ***-ot** are shown below:

	Proto-Gloss	PTB	Chungli	Mongsen
(185)	HORSE	*kor	kuɹ¹	
(186)	ASHES[57]	*hot	aut²	

Table 37: *-or, *-ot

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[55] This reconstruction is from Matisoff 1988: 253.

[56] While my consultant is only familiar with the 'male (of animal)' definition, Clark gives two segmentally-homophonous forms as follows (it is unknown if tone differentiates these two): TEBONG 'the scrotum or cod of male animals' and TEBONG 'male of animals, birds, insects, etc.' (1911: 796).

[57] This reconstruction is from Matisoff 1997: §5.3.

Chungli **kuɹ[1]** 'horse' may reflect the PTB reconstruction given, though the preservation of final *-r is peculiar (-n is expected). A more likely explanation is that this form is a loan from Nagamese **gʰurā/gurā** or Assamese **g�** 'horse' (Boruah 1993: 105).

Chungli **aut[2]** 'ashes' appears to bear a fossilized non-relational prefix **a-**, suggesting that PTB *-ot became -ut in Chungli. If this change is borne out upon consideration of additional data, it must have taken place **after** all the *-ut rimes in Proto-Ao became -ət.

3. DISCUSSION

The main questions addressed in this section are as follows: In broad terms, what sound changes happened in the development from PTB to Ao, and when did they occur in relation to each other?

Perhaps the earliest changes were the alterations of two coda consonants: the 'hardening' of PTB *-s to *-t and *-r to *-n. These changes yielded a merger with PTB rimes already ending in *-t and *-n.

One of the most striking PTB→Proto-Ao developments is the merger of all vowels to schwa[58] before the codas *-m, *-p, *-n, and *-t.[59] With the exception of changes conditioned by the initials, proto-vowels were largely preserved in open syllables and before the codas *-k and *-ŋ.[60] This dichotomy may find its most natural explanation as a difference in the location of oral closure in the coda, which affected the quality of the vocalic nucleus in divergent ways. The bilabial and dental articulations of the coda consonants *-m, *-p, *-n, and *-t yielded a drastically-shortened vocal tract in front of the closure, obscuring the perception of the preceding vowels and providing the impetus for their eventual merger. Open syllables and those closed by the dorsal articulations of *-k and *-ŋ, on the other hand, yielded a greater length of vocal tract and therefore produced less of an effect on the perception of the vowel nuclei, contributing to their preservation in Ao.

Other Proto-Ao developments to be noted are the loss of contrastive vowel length and the 'Proto-Ao schwa-merger', a merger of all vowels to -ə- following the Proto-Ao initial *ts(h)-. The occurrence of these two changes is revealed by the lack of contrastive vowel length in either Chungli or Mongsen and the synchronic phonotactic restriction on /ts(ʰ)/ in both dialects (see §1.3.1 and §1.3.2). A similar merger of all vowels to schwa appears to have occurred in pre-Chungli following *z-, while Mongsen still allows the sequences **za-**, **zu-**, and **zi-**.

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[58] See Figure 1 in Appendix A.

[59] The only apparent exception is PTB *-ot > Chungli -ut, but this change is supported by only one form, based on an older reconstruction ((186) ASHES).

[60] Exceptions to this generalization are PTB *-ik & *-iŋ, which became -ək and -əŋ in Chungli (but were preserved as -ik & -iŋ in Mongsen), and PTB *-o-, which became Ao -u- in all environments.

Two appearances of schwa in Mongsen, however, cannot be attributed to the Proto-Ao schwa merger, namely PTB ***-iŋ*** > Mongsen ***-əŋ*** after ****s-*** (Table 25) and PTB ***-(w)əy*** > Mongsen ***-ə*** after the Proto-Ao dental sibilants ****ts-***, ****z-***, and ****s-*** (Table 21). These two changes suggest the possibility that some sort of schwa-merger took place in Proto-Ao involving **all** the dental sibilants, but more data is needed before this issue can be adequately explored.

All of the PTB open diphthong rimes[61] unglided to monophthongs in Proto-Ao. The back diphthongs (****-a(ː)w***, ****-ow***, and ****-əw***) all monophthongized to their high, back, rounded offglide, merging to **-u** in both dialects. The front diphthongs, however, diverged in their development: In both dialects, PTB ****-a(ː)y*** monophthongized to its low onglide **-a**, while ****-ey*** monophthongized to its high offglide **-i**. The front diphthong ****-əy*** showed divergent behavior for each dialect, ungliding to **-ə** in Chungli but **-i** in Mongsen.

Examining the various cases of PTB ****-a-*** > **-u-** yields the following generalizations: PTB ****-a-*** (not including the diphthongs ****-ay*** and ****-aw***) became **-u-** in Chungli whenever it was preceded by an initial consonant with some sort of velar articulation, including ****k-***, ****ŋ-***, extruded/root-initial/medial ****w*** (with concomitant loss of the ****w***), and ****r-***. Mongsen shows stricter criteria for this development, with PTB ****-a-*** only becoming Mongsen **-u-** when both preceded and followed by velar consonants. Evidently, PTB ****-a-*** became Proto-Ao ****-u-*** when preceded and followed by velar consonants, and this development was then extended in Chungli to all syllables with velar initials.

As mentioned in §2.1.7, initial ****h-*** was lost in pre-Chungli, with the result that all Proto-Ao roots beginning with ****h-*** (or ****hʷ-***) are onset-less in Chungli.

One final observation is that Mongsen is more conservative than Chungli, preserving various proto-rimes which have been altered in Chungli. While the PTB/Proto-Ao open rime ****-a*** became **-a**, **-u**, or **-i** in Chungli, it remained **-a** in Mongsen. Likewise, ****-ik*** and ****-iŋ*** became Chungli **-ək** and **-əŋ**, but largely remained **-ik** and **-iŋ** in Mongsen. Chungli has also merged all vowels to schwa following **z-**, while Mongsen still permits the sequences **za-**, **zu-**, and **zi-**.

A table depicting the relative chronology of these changes can be found in Appendix B.

4. CONCLUSION

This investigation into the historical development of rimes from Proto-Tibeto-Burman into Ao has unearthed several regular sound changes and ordered them according to a relative chronology (see Appendices A and B), a discovery that will facilitate the tasks of 1) reconstructing of Ao at the meso-level ('Proto-Ao'), 2) establishing subgroups with

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[61] See HPTB: 159 for the PTB vowel inventory.

other potentially-related languages of Nagaland based on shared phonological innovations, and 3) determining the proper positions of these languages within the TB family.

By way of conclusion, a few issues should be noted:

Additional Reflexes   Some of the PTB→Ao sound changes described here are based on very few forms. More data is needed to verify their conditioning environments.

Initials   This paper has only concerned itself with Ao rimes; sound correspondences between PTB and Ao initial consonants are yet to be determined.

Prefix Preemption   Prefix preemption, in which a prefix displaces the root-initial) has occurred in a number of Ao forms, reproduced in the table below:

	Proto-Gloss	*PTB*	*Reflex(es) with preemption*	
(9)	TOOTH†	*p-wa	Chungli	tə^2-pu^2
			Mongsen	[tə]-pha
(77)	EIGHT	PKN *d-ryat	Chungli	ti^2
(90)	YAM	*m-n(w)ay	Mongsen	[a]-mi
(100)	PASS	*s-ley	Chungli	səi^{31}
			Mongsen	səj

Table 38: Cases of prefix preemption

In the case of Chungli **ti^2** 'eight', the form appears to have completely lost the original root syllable. It remains to be seen whether prefix preemption is a common phenomenon in Ao and other languages of Nagaland.

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APPENDIX A: SOUND CHANGES

The table below summarizes the PTB→Ao sound changes that took place in the rimes, omitting developments due to stress-reduction, the Proto-Ao schwa-merger following ***ts(h)-**, or the merger of all vowels to schwa following pre-Chungli ***z-**. (see §1.4). Where a single rime has multiple reflexes, the variants are separated by slashes (/) and the conditioning environments are described in the text following the table:

	*a	***i**	***e**	***ə**	***u**	***o**
open	Ch **a/u/i** Mo **a**	**i**			**u**	
*-k	**ak/uk**	Ch **ək** Mo **ik**			**uk**	**uk**
*-l		**?**			**i?**	
*-m	**əm**	**əm?**			**əm**	
*-n	**ən**	**ən**	Ch **ən**			
*-ŋ	**aŋ/uŋ**	Ch **əŋ** Mo **iŋ/əŋ**			**uŋ**	**uŋ**
*-p	**əp**		**əp**		**əp**	
*-r	Ch **ən/un** Mo **ən**				**ən**	
*-s		**ət**			**ət**	
*-t	**ət**	**ət**			**ət**	Ch **ut**
*-w	**u**			**u**		**u**
*-y	**a**		**i**	Ch **ə** Mo **i/ə**		

Table 39: PTB→Ao rime correspondences

PTB ***-a** > Chungli:

    -u   after PTB (labio-)velar initial (***k-**, ***ŋ-**, extruded/root-initial/medial ***w**) and ***r-**

    -i   after PTB sibilant (alternatively: after pre-Chungli palatal initial)

    -a   elsewhere

PTB ***-ak** > Ao:

    -uk   after PTB medial ***-w-**

    -ak   elsewhere

PTB *-**aŋ** > Ao:

> **-uŋ**   after PTB *****k-**
>
> **-aŋ**   elsewhere

PTB *-**a(ː)r** > Chungli:

> **-un**   after PTB *****hʷ** (which became pre-Chungli *****w-**)
>
> **-ən**   elsewhere

PTB *-**iŋ** > Mongsen:

> **-əŋ**   after PTB dental fricative (*****s-**)
>
> **-iŋ**   elsewhere

PTB *-**(w)əy** > Mongsen:

> **-ə**   after Proto-Ao dental sibilant
>
> **-i**   elsewhere

The diagram below depicts the PTB→Ao sound changes undergone by the vowel nuclei and conditioned solely by the coda (thus omitting ***-a-** > **-u-** and appearances of **-i** or **-ə-** due to initial sibilants):
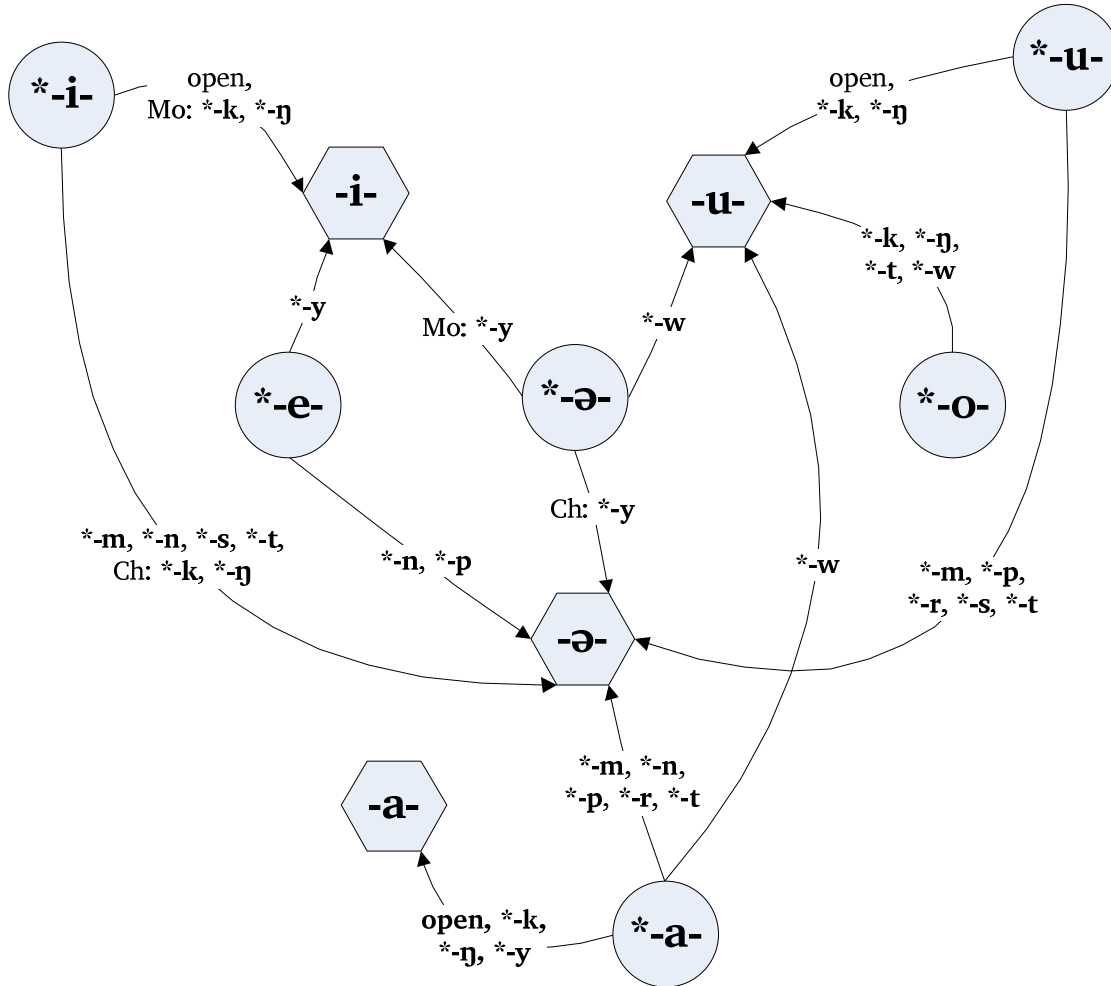
Figure 1: Schematic of major sound changes in vowel nuclei

APPENDIX B: RELATIVE CHRONOLOGY

The table below depicts the development of the PTB rimes/codas (with some general sound changes) through each stage (PTB, Proto-Ao, pre-Chungli/Mongsen). The coda developments ***-r** > ***-n** and ***-s** > ***-t** are assumed to have occurred before the PTB→Proto-Ao rime changes, thereby causing PTB ***-a(ː)r** & ***-uːr** and ***-is** & ***-us** to merge with ***-an** & ***-un** and ***-it** & ***-ut**, respectively, before merging further to ***-ən** and *-**ət**.

The appearance of '…' in cells under the pre-Chungli and pre-Mongsen stages indicates that no change took place in either dialect to alter the sound from its Proto-Ao form:

	PTB	*Proto-Ao*	*pre-Chungli*	*pre-Mongsen*
General sound changes:		all vowels > ə after **ts(h)-** contrastive vowel length lost	all vowels > ə after **z-** all **h-** lost	
Coda changes:	-r > -n -s > -t	-n -t	… …	… …
Open syllable changes:	-a -i -u	-a -i -u	-i after palatal initial[62] -u after (labio)velar -a elsewhere … …	-a … …
Velar rime changes:	-(y)ak -ik -u(ː)k -aŋ -iŋ -u(ː)ŋ	-ak -ik -uk -aŋ -iŋ -uŋ	… -ək … … -əŋ …	… -ik … … -əŋ after **s-** -iŋ elsewhere …

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[62] See the discussion in §2.1.1 following Table 7.

	PTB	Proto-Ao	pre-Chungli	pre-Mongsen
	-wak	**-uk**	…	…
	-(k/ŋ)a(k/ŋ)	**-(k/ŋ)u(k/ŋ)**	…	…
	-ok	**-uk**	…	…
	-oŋ	**-uŋ**	…	…
Bilabial/ dental rime changes:	**-am**	**-əm**	…	…
	-im	**-əm**	…	…
	-um	**-əm**	…	…
	-a(ː)p	**-əp**	…	…
	-up	**-əp**	…	…
	-ep	**-əp**	…	…
	-(y)an	**-ən**	…	…
	-in	**-ən**	…	…
	-un	**-ən**	…	…
	-en	**-ən?**	**-ən**	? (no data)
	-(y)at	**-ət**	…	…
	-it	**-ət**	…	…
	-ut	**-ət**	…	…
	-ot	**?**	**-ut**	? (no data)
Diphthong rime changes:	**-Vw**	**-u**	…	…
	-a(ː)y	**-a**	…	…
	-ey	**-i**	…	…
	-(w)əy	**-(w)əy**	**-ə**	**-ə** after dental sibilant **-i** elsewhere

Table 40: Relative chronology of PTB→Ao sound changes

APPENDIX C: INDEX OF COGNATE SETS

The table below provides an index of the cognate sets in this paper, sorted by proto-gloss:

Proto-Gloss	PTB	Set #
1ST PERSON PRONOUN	*ŋa-y	(91)
2ND PERSON PRONOUN	*na-ŋ	(6)
ASHAMED	*g-yak	(36)
ASHES	*hot	(186)
AWAKEN	*m-sow	(181)
AXE	*r-pʷa	(13)
BAMBOO	*g/r-pʷa	(11)
BASKET	*kaw	(81)
BE DRY	*ka(ː)ŋ	(65)
BE SPENT / BE LOST	*(g/s)-ma-t	(4)
BEAR (A CHILD)	*g-sow	(182)
BEAT / STRIKE	*tup	(168)
BELLY / CAVE	*puːk	(148)
BIRD	*wa	(7)
BITTER	*b-ka-n	(17)
BLACK	*s-nak	(34)
BLACK / INK	*s-maŋ	(64)
BLOCK / PILLOW	*m-kum ≍ *m-kim	(156)
BLOOD	*s-hywəy	(101)
BLOW	*pu	(140)
BOAT	*m-loŋ	(177)
BONE	*s/m/g-rus	(174)
BRAIN	*s/k-lwak	(38)
BREATH(E)	*r-sak	(37)
BUY	*r-ley	(95)
CARRY ON BACK	*bəw	(135)
CENTER	*ts(y)uːŋ	(158)
CHEST	*s-g/k(r)u-k/s	(143)
CHEW	*(N/s)-ǰak	(28)

Proto-Gloss	PTB	Set #
CHICKEN	*haːr	(74)
CHIN	*m-ka-y	(86)
CHIN	*gam	(44)
CLEAR	*(t)syaŋ	(60)
CLOSE (V.)	*dzyiːp	(131)
COMB	*m-si(y)	(107)
COME	*la ≍ *ra	(19)
COME OUT	*s-twak	(40)
COOK / BOIL (V.)	*tsyow	(184)
COPULA / BE	*s-ri(y)-t	(115)
CORPSE	*s-maŋ	(55)
COUNT	*kraŋ ≍ *graŋ	(67)
COVER	*gup	(169)
CURRY	*h(y)an	(54)
DIE	*səy	(111)
DIG	*tu	(142)
DISTRIBUTE	*b-rim	(124)
DOG	*d-kʷəy-n	(102)
DREAM	*r/s-maŋ	(56)
EAGLE / HAWK	*məw	(139)
EAR / HEAR	*r/g-na	(5)
EAT	*dzya-k	(21)
EGG	*dz(y)u	(145)
EIGHT	PKN *d-ryat	(77)
EVIL	*na-n	(52)
EXCREMENT	*kləy	(109)
EYE	*s-mik	(119)
FACE	*cak	(29)
FACE	*s-maːy	(83)
FALL	*kla-k/y/t	(27)
FATHER	*pʷa	(12)
FATHOM	*la(ː)m	(42)
FIELD	*low	(179)
FINGER	*m-yuŋ	(162)

Proto-Gloss	PTB	Set #
FIRE	*mey	(97)
FISH	*s-ŋya	(16)
FIVE	*l/b-ŋa	(15)
FLEA	*s-ləy	(103)
FLY (V.)	*byam	(43)
FOOT / LEG	*r-kaŋ	(68)
FOUR	*b-ləy	(104)
GET UP / RISE	*s-tu	(141)
GO	*s-wa	(8)
GOOD	*s-nam	(45)
GROUND / EARTH	*m-ley	(99)
HAIR	*s-pwa-t	(10)
HAIR	*(t)su-ŋ	(165)
HAIR (HEAD)	*sam	(50)
HAND	*k(r)u-t	(175)
HEAD	*m/s-gaw	(80)
HEAD	*l(y)am ≍ *lum	(157)
HEART	*m-luŋ	(161)
HEAVY	*s-rəy-t	(108)
HIGH / LONG	*m-raŋ	(63)
HIPS	*pen	(92)
HOLD IN MOUTH	*ŋam	(47)
HORSE	*kor	(185)
HORSE LEECH	*m-liːt	(132)
HOT / HURT / PAIN	*tsa-t	(23)
HOUSE	*k-yim	(125)
ITCH	*m-sak	(32)
JUNGLE / FOREST	*ram	(49)
KILL	*g/b-sat	(78)
KNEE	*m-ku(ː)k	(147)
KNOW	*syey-s	(98)
LAUGH	*m-nwi(y)-k	(106)
LEAF	*r-pak	(35)
LEOPARD	*g-zik	(122)

Proto-Gloss	PTB	Set #
LICK	*m/s-lyak	(31)
LIVER	*m-sin	(126)
LIZARD	*r-saŋ	(57)
LOUSE	*s-r(y)ik	(120)
MARROW	*r-kliŋ	(129)
MEAT / ANIMAL	*sya-n	(24)
MOON	*s/g-la	(2)
MORTAR	*(t)sum	(152)
MOUTH	*p(r)(w)aŋ	(59)
NAME	*r/s-miŋ	(128)
NAVEL	*m-la(:)y	(82)
NEAR	*s-naːy	(85)
NECK	*goŋ	(176)
NEGATIVE	*ma-y	(3)
NEGATIVE IMPERATIVE	*ta	(26)
NEW	*sar	(73)
NINE	*d/s-kəw	(136)
NIT	*s-row	(180)
NOSE	*s-na	(25)
ONE	*k-(y)at	(76)
OPEN / MOUTH	*m-ka	(18)
OTTER	*s-ram	(48)
PASS	*s-ley	(100)
PERSON	*r-mi(y)-n	(114)
PIG	*pʷak	(41)
PINCH	*sik	(121)
PLAY	*r-tsyaːy	(89)
POST / COLUMN	*duːŋ	(164)
PUMPKIN	*maːy	(84)
PUMPKIN	PLB *pu[2]	(144)
PUS	*s-naːy	(88)
REAP	*riːt	(133)
RICE	*dzya	(20)
RIPE	*s-min	(127)

Proto-Gloss	PTB	Set #
ROAD	*lam	(51)
RUST	*g/b-syaŋ	(66)
SALT	*m-t(s)i	(118)
SCRATCH	*hyak	(30)
SCROTUM	*s-bloŋ	(178)
SEARCH FOR	*pa	(14)
SEE	*mraŋ	(62)
SEVEN	*s-ni-s	(116)
SHOOT	*gaːp	(71)
SING	*gaːr	(72)
SIT	*myan	(53)
SIX	*d-ruk	(150)
SKY	*r-məw	(137)
SLEEP	*s-yup ≍ *s-yip	(167)
SLICE	*s-lep	(93)
SMELL	*m/s-nam	(46)
SMOKE	*kəw-n/t	(138)
SNAKE	*s-b/m-ruːl	(172)
SNOT	*s-nap	(70)
SOUL	*m-hla	(1)
SOUR	*suːr	(170)
SPITTLE	*m-ts(y)il	(123)
SPLEEN	*r-pay	(87)
STEM	*kuːŋ	(163)
STONE	*r-luŋ	(160)
STRENGTH	*(k/b)-ra(ŋ/m)	(58)
SUCK / KISS	*m-dzup ≍ *m-dzip	(166)
SUN / DAY	*nəy	(105)
SWALLOW	*m-(l)yəw-k	(134)
SWEEP	*py(w)ak	(39)
TAIL	*r-mey	(96)
TESTICLE	*tsyaŋ	(61)
THORN / PIERCE	*tsow-t	(183)
THREE	*g-sum	(154)

Proto-Gloss	PTB	Set #
THROAT	*k/s-ro(k/ŋ)	(151)
THROW (AWAY)	*hʷar	(75)
THUNDER	*m-bruk	(149)
TIGER	*d-kəy	(112)
TONGUE	*m-ley	(94)
TOOTH	*p-wa	(9)
TWENTY	*m-kul	(173)
TWO	*g-ni-s/k	(117)
VAGINA	*tsya	(22)
WAIST / LOINS	*d/s-p(y)i	(113)
WARM	*s-lum � *lim	(153)
WATER	*tsyu	(146)
WEAVE	*tak	(33)
WEEP	*krap	(69)
WIND	*buŋ	(159)
WOOD	*siŋ	(130)
WRAP UP	*tum	(155)
WRING / SQUEEZE	*tsyuːr	(171)
WRITE	*b-rəy	(110)
YAM	*m-n(w)ay	(90)
YOUNGER SIBLING	*naːw	(79)

Table 41: Index of cognate sets by proto-gloss