A phonological profile of Cone

Guillaume Jacques

A phonological profile of Cone[1]

Guillaume Jacques

1. Introduction

The Cone Tibetan language is spoken in Cone county (Chinese *Zhuoni* 卓尼), Gannan Tibetan Autonomous Prefecture in Gansu province. Cone County is home to around 88000 people of which only 60% are Tibetan.[2] The Cone language is only preserved in very few villages. The variety described in this paper is from Nyinpa village (Chinese *Niba* 尼巴, local pronunciation *ɲə²mbœ¹*), located in the southwest of Cone, in the valley of Chas.bu gshus (*Cheba gou* 车巴沟) alongside Mdo.khog (*Daogao* 刀告) village. Nyinpa borders Thebo (*Diebu* 迭部) county in the southeast, Mdzod.dge (*Ruoergai* 若尔盖) county in Sichuan in the southwest and Klu.chu (*Luqu* 碌曲) in the west.

The standard spelling of the county <co.ne> strikes one as non-Tibetan looking. It is pronounced locally as *tɕo²nɛ¹*. Various folk-etymologies have been proposed to explain this name (for instance *gro.nas 'wheat and barley') but none seem fully convincing.

Cone Tibetan has been studied in previous publications, in particular Qu (1962), Yang (1996) and Rnamrgyal (2008).

The present study is based on recordings collected during a field trip in Chengdu in October-November 2010, with a young student (age 23) named Dkon.mchog Rin.chen (公巧仁欠). Although my language consultant has been schooled in Amdo Tibetan since an early age, he still uses his home tongue on a regular basis with his family or with Cone relatives in Chengdu. The data collected include a wordlist, elicited verbal and nominal paradigms, as well as three texts.

The findings of this study are presented in five sections: synchronic phonology, historical phonology, historical morphology, vocabulary and classification. The paper also includes an English-Cone vocabulary of 1300 words with their etymology in Old Tibetan.

2. Synchronic phonology.

Unlike Amdo Tibetan, but similarly to other Tibetan languages of the Northeast like Mbrugchu (*Zhouqu* 舟曲), Cone has lost all initial consonantal clusters from Old Tibetan, but some clusters are preserved intervocalically. Most final consonants have been lost, resulting in a tonal language with a rich consonantal and vocalic inventory, but with a relatively simple syllabic structure.

[1] I wish to thank Dkon.mchog Rin.chen for teaching me Cone Tibetan, and Nathan Hill, Marielle Prins, Hiroyuki Suzuki and Nicolas Tournadre for helpful comments on this paper. Fieldwork in 2010 was funded by the ANR (Agence Nationale de la Recherche) project PASQi (What defines Qiang-ness: Towards a phylogenetic assessment of the Southern Qiangic languages of Muli 07-JCJC-0063).

[2] The sociolinguistic data in this article are taken from Prins' (2002) survey.

2.1 Initials

Nyinpa Cone has the following 46 initial consonants:

p	t		k		
pʰ	tʰ		kʰ		
b	d		g		
mb	nd		ŋg		
	ts	tɕ	tʂ		
	tsʰ	tɕʰ	tʂʰ		
	dz	dʑ	dʐ		
	ndz	ndʑ	ndʐ		
m	n	ɲ	ŋ		
	s	ɕ	ʂ	x	h
	sʰ	ɕʰ	ʂʰ	xʰ	
	z	ʑ	(ʐ)	ɣ	(ʁ)
w	l	j	r		
	ɬ				

This system is particularly unusual typologically for having as many as four contrastive aspirated fricatives (see Jacques 2011). The contrast between /h/, /x/ and /xʰ/ is excessively rare, but clear minimal pairs can be found (see below). [ʐ] is an allophone of /r/ (phonetically a fricativized alveolar trill [r̝]) in the high tone. The status of [ʁ] is problematic, and will be discussed below.

The following examples illustrate all the consonantal phonemes of Cone:

/p/ /pʉː¹/ ‘to heap, to stack’ <dpung>, /pə¹/ ‘hair’ <spu>

/pʰ/ /pʰʉː²/ ‘to push’ <ɦphul>, /pʰɑ¹/ ‘pig’ <phag>,

/b/ /bɑː²/ ‘to soak’ <sbang>, /beː²/ ‘to bury’ <sbas>

/mb/ /mbɑ²/ ‘mask’ <ɦbag>, /mbə²/ ‘worm’ <ɦbu>

/m/ /mɑ¹/ ‘soldier’ <dmag>, /meː¹/ ‘wound’ <rmas>

/w/ /wæ²/ ‘fox’ <wa>, /wõ_²mbæ¹/ ‘deaf’ <ɦon.pa>

/t/ /tɑ¹/ ‘tiger’ <stag>, /tʉ¹/ ‘to chop’ <gtub>

/tʰ/ /tʰɑ¹/ ‘to grind’ <ɦthag>, /tʰʉ¹/ ‘to meet’ <thug>

/d/ /dɑ²/ ‘to lick’ <ldag>, /dʉː²/ ‘to hit’ <rdung>

/nd/ /ndæ²/ ‘arrow’ <mda>, /ndʉ²/ ‘to sit’ <ɦdug>

/ts/ /tsɑː¹/ ‘to beg’ <bslang>, /tsʉ¹/ ‘fontanelle’ <gtsug>

/tsʰ/ /tsʰɑː²/ ‘nest’ <tshang>, /tshuː²/ ‘to sell’ <ɦtshong>

/dz/ /dzɑː²/ ‘moon’ <zla.ba>, /dzeː²/ ‘to speak’ <bzlas>

/ndz/ /ndzɔ²/ ‘yak-bull hybrid’ <mdzo>, /ndzʉ²/ ‘to insert’ <ɦdzugs>

/n/ /næ¹/ ‘snot’ <snabs?>, /nʉ²/ ‘west’<nub>

/s/ /sæ²/ ‘to eat’ <za>, /sʉ²/ ‘to bark’ <zug>

/sʰ/ /sʰɑː²/ ‘ground’ <sa.ba>, /sʰuː²/ ‘basket’ <sle.bo>

/z/ /zaː²/ ‘good’ <bzang>, /zuː²/ ‘carpenter’ <bzo.ba>

/l/ /lɑː¹/ deer‘’ <gla.ba>, /lʉː²/ ‘wind’ <rlung>

/ɬ/ /ɬæ¹/ ‘god’ <lha>, /ɬʉː²/ ‘to fall’<lhung>

/tɕ/ /tɕɑ¹/ ‘iron’ <lcags>, /tɕæ²/ ‘tea’ <ja>

/tɕʰ/ /tɕʰɑ¹/ ‘blood’ <khrag>, /tɕʰʉː²/ ‘small’ <chung>

/dʑ/ /dʑa²/ ‘to be full’ <rgyags>, /dʑʉ²/ ‘to run’ <rgyug>
/ndʑ/ /ndʑu²/ ‘to raise’ <ɦgyog>, /ndʑʉ²/ ‘to suck’ <ɦjub>
/ɲ/ /ɲæ²/ ‘fish’ <nya>, /ɲʉː²/ ‘little’ <nyung>
/ɕ/ /ɕeː²/ ‘mouse’ <byiɦu>, /ɕʉ²/ ‘to paint’ <byug>
/ɕʰ/ /ɕʰeː²/ ‘marmot’ <ɦphyi.ba>, /ɕʰɛ¹/ ‘flour’ <phye>
/ʑ/ /ʑiː²/ ‘to twist (a rope)’ <?>, /ʑær²/ ‘to glue’ <sbyar>
/j/ /jɑː²/ ‘light’ <yang>, /jʉː²/ ‘country’ <yul>
/tʂ/ /tʂɑ²/ ‘cliff’ <brag>, /tʂʉ²/ ‘six’ <drug>
/tʂʰ/ /tʂʰe¹/ ‘horizontal’ <ɦphred>, /tʂʰu¹/ ‘to rob’ <vphrog?>
/dʐ/ /dʐæ²/ ‘sound’ <sgra>
/ndʐ/ /ndʐeː²/ ‘rice’ <ɦbras>, /ndʐʉ²/ ‘dragon’ <ɦbrug>
/ʂ/ /ʂe¹/ ‘bridle’ <srab>, /ʂʉː¹/ ‘to protect’ <bsrung>
/ʂʰ/ /ʂʰeː²/ ‘coarse’ <hral>
/r/ /rʉː²/ ‘to rot’ <rul>, /ʐʉː¹/ ‘snake’ <sbrul>,
/k/ /kɑː¹/ ‘marrow’ <rkang.ba>, /kʉː¹/ ‘to push’ <skul>
/kʰ/ /kʰɑː²/ ‘snow’ <kha.ba>, /kʰʉː¹/ ‘hole’ <khung>
/g/ /gɑː²/ ‘to stride’ <brgal>, /gʉ²/ ‘to wait’ <sgug>
/ŋg/ /ŋgɔ²/ ‘head’ <mgo>, /ŋgɑ²/ ‘to block’ <ɦgag>
/ŋ/ /ŋɔ²/ ‘face’ <ngo>, /ŋʉː¹/ ‘silver’ <dngul>
/x/ /xə²/ ‘to melt’ <zhu>, /æ¹.xi¹/ ‘piglet’ <?>, /xuː¹/ ‘plough’ <gshol>, /xɑː²wɔ/ ‘mother’s brother’ <zhang.bo>
/xʰ/ /xʰə¹/ ‘to die’ <shi>, /xʰi¹/ ‘louse’ <shig>, /xʰʉː²/ ‘place where one sat before’ <shul>, /xʰɑː²/ ‘deer’ <shva.ba>
/ɣ/ /ɣɑː²/ ‘female genital organs’ <gzhang>, /ɣə²/ ‘to cause to melt’ <gzhu>
/h/ /hi¹/ ‘to take off’ <phud>, /hu¹/ ‘to hit a target’ <phog>

Prenasalized stops and affricates are treated as independent phonemes, not clusters in this language, because no {nasal+stop} type clusters are found.

Voiced stops and fricatives (except ʐ-) only occur with a low tone, a fact that will be explained by historical phonology in section 2.3.1.

No initial clusters are found, but between vowels, we find [χ]+voiceless, [ʁ]+voiced and nasal+voiceless stop/affricate clusters (nt, ntʰ, ntsʰ, ntɕʰ, ŋkʰ). [χ]/[ʁ] can be phonologically analyzed as final /-k/. When followed by a syllable with initial k-, final /-k/ after /æ/ and /ɔ/ is realized as a uvular stop. The nasal is always homorganic; we analyze it as an archiphoneme /N/ that functions phonologically as the coda of the first syllable.

Phonetic form	Phonological form	meaning	etymology
lʁχ²tɕʰæ¹	/læk².tɕʰæ/	tool	lag.cha
nʁχ²tɕʰɑ¹	/næk².tɕʰɑ/	wife	nag.chags
pʰʁχ²tsiː¹	/pʰæk².tsiː/	lard	phag.tshil
sɔχ²tĩː¹	/sɔk².tĩː/	pestle	? gtun
tɕɔχ²tsɛ¹	/tɕɔk².tsɛ/	table	cog.tse
ŋɔʁ¹mæ¹	/ŋɔk¹.mæ/	mane	rngog.ma

tɕɔʁ²rõː¹	/tɕɔk².rõː/	valley	grog.rong
tʰɐʁ²riː¹	/tʰæk².riː/	far	thag.ring
tɐ¹qqə¹	/tæk¹.kə/	tiger.GEN	stag.gi
næ¹ntɕʰu¹	/næN¹.tɕhu/	ear	rna.mchog
tɛ¹ŋkʰæ¹	/tɛN¹.kʰæ/	autumn	ston.kha
lɑ²ntʰiː¹	/lɑN.tʰiː/	palm	lag.mthil
tsɛ¹ŋkʰaː¹	/tsɛN¹.kʰaː/	prison	btson.khang
dʑə²ntə²	/dʑəN²tə/	always	rgyun.tu

A marginal contrast between surface [ʁ] and [ɣ] is found in intervocalic position. Both sounds can appear between /æ/ or /ɔ/ and another vowel

Base form	Suffixed form	meaning	suffix	Etymology
tɑ¹	tæ¹ʁe²	tiger	dative	stag
ndu²	ndɔ²ʁæ¹	colour	lexical	mdog
ndʑu²	ndʑɔ²ʁæ²	to put	converbial	ɲjog
mæ¹	mæ¹ɣə¹	low	constative	dma
tʰɔ¹	tʰɔ²ɣə¹	high	constative	mtho

Although the diachronic origin for this contrast is clear, its synchronic analysis is not straightforward. Positing a distinct phoneme /ʁ/ is not entirely satisfying not only because of its marginal status, but also because it considerably complexifies the morphological analysis. The sequences æʁV and ɔʁV occur in forms corresponding to Old Tibetan -ag and -og followed by a vowel-initial suffix, in particular in the dative and the converbial suffixes (the complete paradigms involving these two suffixes will be described in the section on morphology). æʁV and ɔʁV alternate with –ɑ and –ɔ respectively in non-suffixed forms.

A possible analysis for these sequences, which would account well for the morphology and the diachrony, is to suppose that [ʁ] is the surface reflex of final –k in syllable-final position when it is reassociated to the initial of the following syllable. In this theory, tæ¹ʁe² and ndʑɔ²ʁæ² are to be analyzed as /tæk¹.e/ and /ndʑɔk²-ɛ/ underlyingly. However, in view of the highly abstract character of this analysis, we perfer to maintain in our transcription the symbol ʁ in this context in order for it to remain legible.

We find geminate consonants intervocalically, always preceded by short vowels. Only unaspirated unvoiced stops and nasals are geminated. Although no minimal pair between geminate and non-geminate could be found, there is little doubt that geminates are phonemic, as we do find non-geminated consonants following short vowels (e.g. /tɕʰə²tɔ¹/ ‘lip’ <mchu.to>). The following examples illustrate geminated consonants (we transcribe the geminated by the archiphonemes /C/ for oral stops and /N/ for nasal ones):

Phonetic form	Phonological form	meaning	Etymology
mə¹kkæ¹	/məC¹.kæ/	fog	smug.pa
ɕʰə²ttiː¹	/ɕhəC².tiː/	heel	phyi.rting
æ¹ttæ¹	/æC¹tæ/	hoe	?
rə²ppæ¹	/rəC²pæ	wisdom	rig.pa

næ¹ŋŋɔ¹	/næN¹ŋɔ/	sky	gnam.ngo
ŋæ¹mmæ¹	/ŋæN¹.mæ/	in the old days	snga.ma

The phonological rules governing the morphophonemes /-k/, /-C/ and /-N/ will be described in detail in 3.5.1. Additionally, two morphophonemes /G/ and /D/ will be posited to account for various morphological alternations. They are realized as [k], [g], [ɣ] and [t], [d], [r] depending on the preceding consonant. The distribution of these allomorphs will be set out in section 4.1.1.

2.2 Rhymes

Excluding the cases of final /–k/, /-C/ and /-N/ at morpheme boundaries described in the previous section, of the nine final consonants of Old Tibetan, only –r is preserved in Cone. Most syllables are open syllables with no final consonant.

The vocalic system is extremely rich. The following 23 vocalic phonemes are attested:

i	iː	ʉ	ʉː	u	uː		ĩː		(ũː)
ɪ	ɪː								
e	eː			o	oː		ẽː		õː
ɛ		ə		ɔ					
æ				ɑ	ɑː			ãː	

Since tonemes have markedly distinct realizations with short and long vowels, one could propose an alternative analysis with four instead of two tonemes (see next section) and view vowel length as a secondary feature of tones; the vowel system would then be reduced to 15. However, we will see that this analysis is problematic.

Cone is the only known dialect of Tibetan with five degrees of height (i ɪ e ɛ æ) independently of vowel length or vowel quality. The following examples illustrate the vowel phonemes:

/i/ /tsi¹/ ‘to lay bricks’ <rtsig>, /ki¹/ ‘to dye, present’ <skud>

/iː/ /tsiː¹/ ‘to count, past’ <brtsis>, /tiː¹/ ‘to spread (a sheet), past’ <btings>, /kiː¹/ ‘to steal, past’ <brkus>

/ɪ/ /tɪ²/ ‘to catch up’ <ded>, /pɪ²/ ‘Tibetan’ <bod>

/ɪː/ /tsɪː¹/ ‘to cook, past’ <btsos>, /tɪː¹/ ‘to watch, imperative’ <bltos>, /kɪː¹/ ‘to dig, past’ <brkos>

/e/ /tse¹/ ‘to cut’ <gtsab>, /te¹/ ‘to plant’ <btab>, /ke¹/ ‘to cover’ <bkab>

/eː/ /tseː¹/ ‘to search, past’ <btsal>, /peː²/ ‘wool’ <bal>

/ɛ/ /rə²tsɛ¹/ ‘summit’ <ri.rtse>, /ɛ¹sɛ¹/ ‘cotton’ <srin?>

/æ/ /tsæ¹/ ‘grass’ <rtswa>, /tæ¹/ ‘horse’ <rta>

/ʉ/ /tsʉ¹/ ‘top of the head’ <gtsug>, /tʉ¹/ ‘to cut off’ <gtub>

/ʉː/ /kʉː¹/ ‘to push’ <skul>, /dʉː²/ ‘to hit’ <rdung>

/ə/ /tsə¹/ ‘to count’ <rtsi>, /kə¹/ ‘to steal’ <rku>

/u/ /tu¹/ ‘to hang, imperative’ <thogs; analogical>, /ku¹/ ‘to block’ <khog; analogical>

/uː/ /tuː¹/ ‘to think, imperatifve’ <thong; analogical>, /tsuː¹/ ‘to sell’ <btsongs>

/o/ /ɲo¹/ ‘man, dative’ <mi.la>, /mbo²/ ‘bug, dative’ <ɦbu.la>

/oː/ /toː²/ ‘smoke’ <du.ba>, /loː¹/ ‘lung’ <glo.ba>
/ɔ/ /kɔ¹/ ‘to carve, present’ <rko>, /hú/ ‘target’ <phog>
/ɑ/ /kɑ¹/ ‘to block, past’ <bkag>, /tɑ¹/ ‘tiger’ <stag>
/ɑː/ /kɑː¹/ ‘marrow’ <rkang>, /lɑː¹/ ‘deer’ <gla.ba>
/ĩː/ /pĩː¹/ ‘incense’ <spos>, /ɲĩː¹/ ‘name’ <ming>
/ẽː/ /tẽː¹/ ‘felt’ <stan>, /tsẽː¹/ ‘to sew, past’ <btsems>
/ã/ /nã²/ ‘forest’ < nags >, /nã¹/ ‘pus’ <rnag>
/ãː/ /nãː¹/ ‘sky’ <gnam>, /tãː¹/ ‘to speak, present/past’ <gtam, btams>
/õː/ /kõː¹/ ‘thirsty’ <skom>, /tõː¹/ ‘to speak, imperative’ <gtoms>

The vowel length contrast is neutralized with the low vowels /æ/, /ɔ/, /ɛ/ and the nasal vowels /ĩː/, /ẽː/, /õː/. Only /ãː/ has a short counterpart /ã/ in a few words. The status of /ũː/ as a phoneme is problematic, as it is only attested in a few items with palatal or alveolo-palatal initial: /ɲũː²/ <nyol>, the imperative of /ɲãː²/ ‘to sleep’ <nyal>, /tɕũː²wãː¹/ ‘Potentilla anserina’ <gro.ma> and /mbə² tɕũː²wãː¹/ ‘ant’ <ɦbu.grog.ma>. There is no obvious minimal pair with /õː/.

The only final consonant in monosyllabic words is –r; only the following four closed syllables rhymes are attested:

/ær/ /kær¹/ ‘to chop firewood, past’ < bkar? >, /zær²/ ‘steep’ <gzar>
/or/ /kor¹/ ‘to turn’ < skor >, /tor¹/ ‘to scatter’ <gtor>
/er/ /ndzer²/ ‘nail’ < ɦdzer >, /ser¹/ ‘gold’ <gser>
/ər/ /sər²/ ‘angle’ <zur >, /kər²/ ‘tent’ <gur>

In disyllables, short vowels belonging to the set that have a length contrast (i ɪ e u ʉ ɑ) become long when there is no cluster or geminated consonant between the two syllables. For instance, ɲi¹ ‘eye’ <dmyig> becomes ɲiː¹ in ɲiː¹xʰer¹ ‘glasses’ <dmyig.shel> and other compounds.

2.3 Suprasegmentals

As mentioned in section 2.2, the analysis of the tonal system critically depends on how the vowel system is analyzed. Under the analysis with contrastive vowel length proposed in the previous section, only two tonemes on monosyllables are necessary: a high tone (transcribed ¹) and a low tone (transcribed ²).[3]

Phonological form	realization	meaning	etymology
nãː¹	nãː⁵⁵	sky	gnam
nãː²	nãː²⁴	inside	nang
nã¹	nã⁵²	pus	rnag
nã²	nã¹²¹	forest	nags

The tones are realized as falling on short vowel monosyllables, and level on long vowels. The falling tone on short vowels is slightly more prominent with vowels that have a contrast between long and short vowels (this includes i ɪ u ʉ e o ɑ) that with vowels that only have short vowels (ə ɛ ɔ æ): the latter can be realized either as level or falling tones, and are not normally realized as falling when they occur in the second syllable of a dissyllable (for instance /pɔ²lɔ¹/ ‘ball’ <spo.lo> is realized as [pɔ¹¹lɔ⁵⁵],

[3] The analysis of Cone Tibetan has having only two tonemes was first proposed by Sun (2003:42) using data from Qu (1962).

whereas /dɔ²lɪ¹/ ‘board’ <rdo.leb> is realized as [dɔ¹¹lɪ⁵²]).[4]

Given the clear difference in tonal realization between long and short vowels, it is legitimate to envision an alternative analysis with four tones and no contrastive vowel length.[5]

However, this analysis becomes difficult when morphology is taken into account. When any suffix is added (for instance the verbal constative –ɣə suffix), the high tone of short-vowel words is realized as 55, and the low tone 11: no final fall is observed anymore. Data from the following table illustrate this phenomenon:

basic form underlying	realization	suffixed form underlying	realization	meaning	etymology
tæ¹	tæ⁵²	tæ¹ɣə	tæ⁵⁵ɣə⁵⁵	to see	lta
tsə¹	tsə⁵²	tsə¹ɣə	tsə⁵⁵ɣə⁵⁵	to count	rtsi
dæ²	dæ¹²¹	dæ²ɣə	dæ¹¹ɣə⁵⁵	to pursue	bda
zə²	zə¹²¹	zə²ɣə	zə¹¹ɣə⁵⁵	to be drunk	bzi

If the short-vowel words were analyzed as having falling tones, by contrast with level tones for long-vowel words, we would expect /tæ^{HL}-ɣə/ to be realized *tæ⁵²ɣə¹¹ with a low tone on the second syllable.

Tone is not contrastive for syllables with aspirated consonants. Such syllables normally have low tone when the vowel is long, and high tone when it is short. Syllables with high tone in isolation always have low tone when suffixed:

basic form underlying	realization	suffixed form underlying	realization	meaning	etymology
tʰɔ¹	tʰɔ⁵²	tʰɔ²ɣə	tʰɔ¹¹ɣə⁵⁵	high	mtho
xʰə¹	xʰə⁵²	xʰə²ɣə	xʰə¹¹ɣə⁵⁵	to die	shi
tʰɑ¹	tʰɑ⁵²	tʰæk²ɣə	tʰɐ¹¹qqə⁵⁵	to weave	ɦthag
pʰe¹	pʰe⁵²	pʰɛC²ɣə	pʰɛ¹¹kkə⁵⁵	to go	phebs

In dissyllabic words, when the first syllable is in the high tone, this tone spreads to the next syllable. For instance ɲeː¹ŋgɔ¹ ‘pillow’ <sngas.mgo> has high tone on the second syllable in spite of the fact that this syllable, when used in isolation, is in the low tone ŋgɔ² ‘head’ <mgo>. This rule of rightward tonal spread HL > HH occurs in also nominal compounds. It does not apply to the case markers and some verbal suffixes which are always realized low.

When the first syllable is low lone, the tone of the second syllable is also predictable. It is high when the vowel of the second syllable is short, as in /rə²ŋgɔ/ ‘top of the mountain’ <ri.mgo> realized as [rə²ŋgɔ¹] (note that ŋgɔ² ‘head’ is low-tone when used as an independent word). When the vowel of the second syllable is long, it is generally high when the initial consonant of the second syllable is an unvoiced obstruent, and low (phonetically rising) when the consonant is voiced, though free variation is observed. For instance, the dissyllable /rə²ɣuː/ ‘rabbit’ <ri.bong> can be realized either as [rə¹¹ɣuː⁵⁵] or [rə¹¹ɣuː²⁴].

[4] This synchronic tendency has a historical explanation which will be set out in section 3: the short vowels that have long counterparts almost always come from checked syllables, whereas the four without long counterpart come from open syllables.

[5] This alternative analysis was in fact the author’s first attempt at analyzing the tonal system of Cone Tibetan.

We have not found any contrast between LL and LH dissyllables. Even though tonal patterns are predictable in Cone Tibetan, we prefer to indicate tones on all syllables to ease the readability of this article.

3. Historical phonology

The phonological system of the Cone language described in the previous section considerably differs from that of Old Tibetan.[6] Old Tibetan had more than 210 initial clusters, including clusters with four consonants such as bsgr– while Cone has none; Old Tibetan only had five vowels (perhaps six, if the *gi-gu phyir log* is considered to represent an independent phoneme), whereas Cone Tibetan has 23 vowel phonemes; Old Tibetan had nine consonant in coda position (m n ŋ b d g r l s) and even some final clusters, while Cone only has –r in absolute final position and also –k as well as the archiphonemes –C and –N inside a word.

Since Old Tibetan is very close to being the common ancestor of all Tibetan dialects,[7] these differences can be explained in terms of phonological changes from Old Tibetan to Cone. As all Tibetan languages, however, Cone has several layers of vocabulary, including a sizeable portion of loanwords from Amdo Tibetan, which is why several rhymes and onsets has several distinct correspondences between OT and Cone. In order to properly study Cone historical phonology, distinguishing these layers of borrowings from the inherited vocabulary is of the utmost importance.

In order to avoid circularity, we will first present all the attested correspondences between OT and Cone for the tones, the rhymes and the onsets, and will analyse the layers of vocabulary only after all correspondences have been sorted out.

3.1 Suprasegmentals

While Old Tibetan is generally considered to have been a non-tonal language, Cone Tibetan, as described in the previous section, has developed a two-tone system. The tonal system of Cone was transphonologized out of phonemic contrasts in the onset.

The following table summarizes the correspondences between Nyinpa Cone and OT. The rows indicate the OT initial consonant, while the rows indicate the preinitial consonants.[8] Shaded slots indicate combinations unattested in OT, such as *ms or *Nl.

	no preinitial	b d g	m N	s r l
p t ts c k	H	H		H
s sh	L/H	H		
ph th tsh ch kh lh rh h	L/H		L/H	
b d dz j g z zh	L	L (except dby-)	L	L (except sbr– and sgr-)

[6] For an account of the phonological system of Old Tibetan, see Hill (2010).
[7] Some features, such as uvulars in eastern dialects, might reflect pre-Old Tibetan phonological contrasts (Sun 2003).
[8] In OT, the structure of the onset was $(C^1C^2)C^3(C^4)$-. We call C^3 the initial consonant, C^1 and C^2 are preinitials and C^4 is the medial.

m n ny ng	L	H	H	H
r l w ɦ	L	H		H

The basic rules are the following:

1. Syllables with unvoiced unaspirated stops and affricates initials in OT develop high tone in Cone.
2. Syllables with aspirated consonants (including fricatives without preinitial, which develop aspiration, as will be shown in 2.3) develop low tone when the vowel is long and high tone when it is short (see Qu 1962, Sun 2003:42). As described in section 1.3, all aspirated onsets with high tone in isolation become low tone when suffixed or as first element of a compound.
3. Syllables with sonorant initials develop low tone when they are without preinitials in OT, and high tone when they had preinitials. Clusters in {stop+r} (br-, dr-, gr-) should be analyzed as initial+medial, not preinitial+initial, and fall under case 4 below. sr-, on the other hand, is a cluster of the type preinitial+initial, and develops high tone.
4. Syllables with voiced stop and fricatives always develop low tones, except isolated cases such as dbyV– which becomes jV¹ and sbr-/sgr– which become ʐV¹. Note that in these cases, the initial b/g of OT undergoes lenition.

This tonal system slightly differs from the variety of Cone Tibetan described by Qu (1962), where syllables with non-nasal preinitials develop high tone, even when the initial is a voiced stop. For instance, the noun /duː²/ ‘tree’ <sdong> in Nyinpa Cone has high tone in the variety studied by Qu.

We only find a very limited number of exceptions to the generalizations presented above.

meaning	Cone	Old Tibetan	Classical	tonal pattern	expected
fire	ɲɛ¹	mye	me	H	L
man	ɲə¹	myi	me	H	L
swallow	ɲi¹		mid	H	L
eye	ɲi¹	dmyig	mig	H	L
name	ɲĩː¹	mying	ming	H	L
husband	mæ¹qqæ¹		mag.pa	HH	LH
milk	õː¹wãː¹		ɦo.ma	HH	LH
to believe	lõː²		brlom	L	H
wrinkled	ɲer²		gnyer	L	H
to use	kuː²		bkol	L	H
to dream	ɲə²ˌɲiː²	rmyi	rmi, rmis	L	H
lamp	kær²mɛ¹		dkar.me	LH	HH
first month	tɕə²kkæ¹		gcig.pa	LH	HH
soul	nãː²xʰĩː¹		rnam.shes	LH	HH
chimney	kær²kʊː¹		skar.gung	LH	HH
wheel	pɔ²lə¹		spo.lo	LH	HH
wolf	ɕæ²ŋkʰə¹		spyang.ki	LH	HH
white	kæ²ruː²		dkar.po	LL	HH
camel	ŋæ²wõː²		rnga.mong	LL	HH

The six etyma with m– initial in the standard Tibetan orthography and a high tone in Cone probably reflect alternative Old Tibetan forms with preinitial. Note that the spelling *dmyig* for "eye" is widely attested in pre-Xth century texts (for instance, OT.739; 02r10). Comparison with other conservative languages such as Rgyalrong suggest that Cone, as other Tibetan languages, preserves here traces of prefixes not attested in the written corpus of Tibetan:

meaning	Classical Tibetan/ Old Tibetan	proto-Cone	Japhug Rgyalrong
fire	me, mye	*Cmye	smi
man	mi, myi	*Cmyi	tɯ-rme
eye	mig, dmyig	dmyig	tɯ-mɲaʁ <*mjaq
name	ming, mying	*Cmying	tɤ-rmi
husband	mag	*Cmag	tɯ-nmaʁ < *tmaq
swallow	mid	*Cmyid	

Except for *smi* 'fire', whose cluster is probably secondary,[9] the other clusters cannot be explained away as being secondary in Rgyalrong, and we may hypothesize that non-standard dialects of Old Tibetan had similar clusters in these words: we would have to reconstruct for proto-Cone the non-standard forms above (C– in our reconstruction represents either d-, r-, s-)

For the other examples, the tonal irregularities are not explainable, and could reflect either borrowings from another dialect or non-standard variants.

3.2 Rhymes (basic correspondences)

As in many Tibetan languages, many rhymes have double correspondences depending on whether they occur at the end of a phonological word or are followed by another syllable. We call the reflex occurring word-finally *base form* and the one occurring word-internally *conjunct form*. For instance, the rhyme –ɑ from OT –ag and –eg has a conjunct form æq-, the verb /tɕɑ¹/ 'to cut' <bcag> has a conjunct form /tɕæ¹qqə¹/ <bcag.gi>.

The base form can be found in some rare cases in the first syllable of a dissyllable if the second syllable onset is a prenasalized stop:

Cone	etymology	meaning
tʂʰɑ²ŋgɔ¹	*phrag.mgo	shoulder
lɑ²ntʰiː¹	lag.mthil	palm of the hand
dɑ²ndzʉ¹	ldag.mdzub	forefinger

Additionally, as mentioned in the introduction of section 2, we find multiple correspondences between OT and Cone in the same context due to the presence of several layers of words.

3.2.1 Open syllables

The open syllables of OT evolve into short vowels; there is no base vs. conjunct forms

[9] As pointed out by Jackson Sun (p.c. 2002), the s– reflect the etymon si "wood": smi was originally a compound meaning "firewood".

for these rhymes:

OT	Cone	Example	etymology	meaning
a	æ	tæ¹	rta	horse
e	ɛ	ndzɻɛ²	ɦdre	ghost
i	ə	ndzɻə²	ɦbri	female yak
o	ɔ	tɕɔ²	gro	wheat
u	ə	mbə²	ɦbu	bug

These straightforward correspondences have several exceptions.

First, the Old Tibetan suffixes –ma and –mo generally become –wãː and –wõː respectively in Cone instead of regular –mæ and –mɔ, which are however also attested.

Second, in dissyllables whose second syllable is –wãː¹ from –ma, open syllable –o undergoes nasal assimilation and becomes –õː.

OT	Cone	Example	etymology	meaning
o	õ	sõː¹wãː¹	so.ma	hemp
o	õ	õː¹wãː¹	ɦo.ma	milk
o	õ	ʂõː¹wãː¹	sro.ma	nit
o	õ	sʰõː²wãː¹	so.ma	new
o	ũ	tɕũː²wãː²	gro.ma	Potentilla anserina

There is no explanation for why we find /ũː/ not /õː/ in the last word; compare the quasi-homonym /mbə² tɕũː²wãː¹/ ‘ant’ <ɦbu.grog.ma>.

Third, we find some words with unexpected final –r:

OT	Cone	Example	etymology	meaning
a	ær	mær¹ɕæ¹	rma.bya	peacock
a	ær	ŋær¹	rnga	drum
e	er	ndzɻer², ɕʰer¹	ɦbyed, phye	to open

The first two examples evince cases of metathesis, which however do not apply accross the board in the whole vocabulary. For instance <rma> ‘wound’ becomes /mæ¹/ with high tone, not *mær¹ as would be expected if the metathesis were regular. For ‘to open’, the final –r is mysterious; no other word in the language presents such a correspondence.

Finally, we find unusual correspondences which only apply to only one or two lexical items, usually in the first syllable of a dissyllable:

OT	Cone	Example	etymology	meaning
e	æ	ɕæ²wæ¹	bye.ma	sand
e	iː	ɲiː¹wãː¹	snye.ma	spike
e	iː	kæ²liː²	ga.le	slow
e	ɪː	lãː¹wõː¹tɕhɪː²	glang.po.che	elephant
e	eː	geː²gẽː²	dge.rgan	teacher
o	æ	gæ²wãː¹	sgo.nga	egg
o	ə	lə²wãː¹	lo.ma	leaf

3.2.2 Final stop rhymes

These rhymes exhibit the most complex patterns of alternations between base and conjunct form. Old Tibetan had three final stops –b –d –g which could additionally combine with –s in the complex codas –bs and –gs. –s as the second element of a coda does not seem to have left any trace in Cone, so that we will treat –bs and –gs alongside –b and –g.

For final –g, the basic correspondences are the following:

OT	Cone	Example	etymology	meaning
ag(s)	ɑ	tɑ¹	stag	tiger
	æq-	tæ¹qqæ¹	stag.pa	birch
eg(s)	ɑ	ʂɑ¹	sreg	to burn
	æq-	ʂæ¹qqə¹	sreg.gi	to burn (conjunct)
ig(s)	i	xʰi¹	shig	louse
	əC-	ɲə¹ppə¹	rmig.pa	hoof
og(s)	u	tu²	dog	narrow
	ɔq-	tɔ²qqə¹	dog.gi	narrow (conjunct)
ug(s)	ʉ	gʉ²	sgug	to wait
	əC-	gə²kkə¹	sgug.gi	to wait (conjunct)

Old Tibetan /a/ and /e/ merge before –g. –ig and –ug have the same conjunct form –əC. We find three groups of exceptions to these correspondences.

First, three examples of –ag with an initial nasal have short /ã/ instead of /ɑ/; this is the sole diachronic origin of the rare vowel /ã/:

OT	Cone	Example	etymology	meaning
ag	ã	mbə²nã¹	ɦbu.nag	fly
		nã¹	rnag	pus
		nã²	nags	forest

We did not find the syllable */nɑ/ in our Cone data, suggesting that nag > nã could be a regular sound change.[10] However, we also find cases of sporadic nasality in other rhymes, as will be shown below.

Second, –ug corresponds to –i in three lexical items:

OT	Cone	Example	etymology	meaning
ug	i	kʰæ²læ¹ ji²	kha.la.yug	swallow (bird)
ug	i	xɔ²ʁdi¹	*zhabs.gdugs or *zhogs.gdugs?	umbrella
ug	iː	ɲiː¹wãː¹	smyug.ma	bamboo

Third, the noun /ɲi¹/ ‘eye’ <dmyig>, when used as the first element of a compound never occurs as a conjunct form. Instead, we find the basic form with alengthened vowel:

OT	Cone	Example	etymology	meaning
ig	iː	ɲiː¹dzə¹	<dmyig.rdzi>	eyelash
		ɲiː¹pɑ¹	<dmyig.lpags>	eye
		ɲiː¹tɕə¹	<dmyig.chu>	tears
		ɲiː¹xʰer¹	<dmyig.shel>	glasses

[10] Nasality is found in these words in other dialects such as Shuiluo Kami nã¹ ‘pus’, nã² ‘woods’ (fieldwork of the author).

Finally, the noun ʂɔ²qqæ¹ ‘lasso’ seems to come from <zhags.pa>, though the vowel correspondence does not fit well.

The rhymes with final –d present the following correspondences:

OT	Cone	Example	etymology	meaning
ad	e	se¹	bsad	to kill
	ɛC-	sɛ¹kkə¹	bsad.gi	to kill (conjunct)
ed	ɪ	ndɪ²	ɦided	to chase
	ɛC-	ndɛ²kkə¹	ɦided.gi	to chase (conjunct)
id	i	ɲi¹	*Cmyid	to swallow
	əC-	ɲə¹ppæ¹	*Cmyid.pa	oesophagus
od	ɪ	pɪ²	bod	Tibetan
	ɛC-	pʰɛ²ppæ¹	phod.pa	courage
ud	i	tʰi¹	mthud	to connect
	əC-	tʰə²kkə¹	mthud.gi	to connect (conjunct)

The rhymes in mid-high vowels –od and –ed merge in Cone, as do the rhymes in high vowel –ud and –id, which also merge with –ig.

A recurrent irregular correspondence is Cone /ɔ/ for OT –od:

OT	Cone	Example	etymology	meaning
od	ɔ	tiː²tʂʰɔ¹	de.khrod	in the future
	ɔ	tsʰɔ²mæ¹	tshod.ma	vegetable
	ɔC-	kɔ¹ppæ¹	bkod.pa	manner
	ɔC-	ndʑɔ²ppæ¹	ɦgyod.pa	regret

We also find the following correspondences (not the effect of the vowel lengthening rule in the first syllable in keː¹wæ¹ and kʉː¹wæ¹).

OT	Cone	Example	etymology	meaning
ad	ɪ	ɲɪ¹	rmad	saddle's crupper
		tɕʰə²mɪ¹	chu.smad	lower reaches of a river
ed	e/ɛC-	dʑe², dʑɛ²kkə¹	brjed	forget
		tʂʰe¹, tʂʰɛ¹re	ɦiphred	horizontal
		keː¹wæ¹	sked.ba	waist
id	ʉ/əC-	tʂʰʉ¹, tʂʰə²kkə¹	ɦikhrid	to teach
od	e/ɛC-	ɬe¹, ɬɛ²kkə¹	lhod	relaxed
ud	ʉ	kʉː¹wæ¹	skud.ba	thread
ud	u	uː¹du¹	ol.mdud	larynx

Final –b rhymes are less common than the two preceding ones. The rhyme –ob(s) is too poorly attested to figure in the following table. The rhyme –eb(s) had two common reflexes/ɪ/ and /e/, even in verbal form.

OT	Cone	Example	etymology	meaning
ab(s)	e	ʂe¹	srab	thin
	ɛC-	ʂɛ¹kkə	srab.gi	thin (conjunct)

eb(s)	ɪ	tɪ¹	lteb	to fold
	e	nde¹	ɦidebs	to plant
	ɛC-	tɛ¹kkə¹,	lteb.gi	to fold (conjunct)
		ndɛ² kkə¹	ɦidebs.gi	to plant (conjunct)
ib(s)	ʉ	xʉ²	zhib	fine (conjunct)
	əC-	xə²kkə¹	zhib.gi	fine
ub(s)	ʉ	tʉ¹	gtub	to chop
	əC-	tə¹kkə¹	gtub.gi	to chop (conjunct)

In our Cone data, the only example of –ob is jɔ²tɕẽː¹ ‘stirrup’ <yob.can>. We also find the following irregular correspondences:

OT	Cone	Example	etymology	meaning
ub	i	tɔ²ni¹	do.nub	tonight
abs	æ	næ¹	snabs?	snivel, snot
abs	i	wæ²li¹	rba.rlabs	wave
ab	ɑ	dʑæ²kʰɑ¹	rgyal.khab	country
ibs	i/əC-	di², də²kkə¹	rdibs	collapse

Finally, we find cases when the conjunct form is resyllabified as a –ə or –æ suffix is added: the –C surfaces as [ɣ] and the –q as [ʁ]. This phenomenon regularly occurs in nominal and verbal morphology, and will be discussed in more detail, there, but here are some examples within lexical items:

OT	Cone	Example	etymology	meaning
ub	əC– > əɣ	/tsəC¹-ə/ > tsə¹ɣə¹	rtsib	rib
ugs	əC– > əɣ	/tsʰəC²-æ/ > tsʰə²ɣæ¹	tshugs.ka	appearance
og	ɔq– > ɔʁ	/ndɔk²-æ/ > ndɔ²ʁæ¹	mdog	colour

3.2.3 Final nasal rhymes

Old Tibetan had three final nasal consonants –m, –n and –ng. As with the stop coda rhymes, these rhymes present distinct basic and conjunct form, especially –m and –n.

Rhymes with final –ng show two distinct set of correspondences. In the first set we find no final nasal: a long oral vowel is found instead; they have no distinct conjunct forms.

OT	Cone	Example	etymology	meaning
ang(s)	ɑː	tɕɑː¹	bcang	to hold tight
eng(s)	eː	tʰɔ²reː²	tho.rengs	tomorrow
ing(s)	iː	riː²	ring	long
ong(s)	uː	duː¹	sdong	tree
ung(s)	ʉː	lʉː¹	rlung	wind

In the second one, we have nasal vowels instead:

OT	Cone	Example	etymology	meaning
ang(s)	ãː	ɕãː²	byang	north
eng(s)	ãː	kãː²sʰãː¹	gangs.seng	panther

ing(s)	ĩː	ɲĩː¹	*Cmying	name
ong(s)	õː	sʰæ²tõː¹	sa.dong	cave
ung(s)	õː	sõː¹	gsungs	to say, honorific
	ɔN-	sɔ²ŋgə¹	gsungs.gi	to say, honorific (conjunct)

The origin of this split are complex and will be treated in detail in section 2.4 on interdialectal borrowing. Only very few words belonging to the second set have a distinct conjunct form, as sõː¹, sɔ²ŋgə¹ above.

Outside of these two sets, we find four exceptions:

OT	Cone	Example	etymology	meaning
ong	iː	diː²wãː¹	gdong.ma	beam (house)
ong	ɔ	kɔ²ŋæ¹	gong.ba	collar
ang	æ	kæ¹wæ¹	rkang.ba	foot; leg
ung	uː	pʰuː²	phung	corpse

Rhymes with a –n coda present distinct basic and conjunct forms. In Old Tibetan, there was a complex coda –nd with the *da.drag*, but these codas do not present any distinct correspondence in Cone.

OT	Cone	Example	etymology	meaning
an(d)	ẽː	ɲẽː²	nyan	to hear
	ɛN-	ɲɛ²ŋgə¹	nyan.gi	to hear (conjunct)
en(d)	ẽː	tʂẽː²	dran	to miss so.
	ɛN-	tʂɛ²ŋgə¹	dran.gi	to miss so. (conjunct)
in(d)	ĩː	ʂĩː	sprin	cloud
	əN-	tɕʰə²mbæ¹	mchin.pa	liver
on(d)	ẽː	kẽː²	gon	to wear
	ɛN-	kɛ²ŋgə¹	gon.gi	to wear (conjunct)
	õː	tʰõː²	thon	to arrive
	ɔN-	tʰɔ²ŋgə¹	thon.gi	to arrive (conjunct)
un(d)	ĩː	ndzĩː¨²	ɦdzin	to take
	əN-	ndzə²ŋgə	ɦdzin.gi	to take (conjunct)

The rhyme –on has two distinct correspondences –ẽː and –õː which will be further discussed in section 2.4

We also find two irregular examples with rhymes in –n corresponding to –ɛ. Both have a prefix ɛ¹– whose etymology is unclear.

OT	Cone	Example	etymology	meaning
an	ɛ	ɛ¹ŋɛ¹	a.ngan	little finger
in	ɛ	ɛ¹sɛ¹	srin[11]	cotton
on	uː	guː²mæ¹	dgon.ma	mare

The correspondences for rhymes in –m are straightforward:

[11] From <srin.bal> ‘demon wool’ = ‘cotton’ or ‘silk’, Japhug Rgyalrong *srun* ‘cotton’.

OT	Cone	Example	etymology	meaning
am(s)	ãː	sãː¹	bsam	to think
	aN-	sæ¹ŋgə¹	bsam.gi	to think (conjunct)
em(s)	ẽː	tsʰẽː²	ɦtshem	to sew
	ɛN-	tsʰɛ²ŋgə¹	ɦtshem.gi	to sew (conjunct)
im(s)	ĩː	xĩː²	zhim	delicious
	əN-	xə²ŋgə¹	zhim.gi	delicious (conjunct)
om(s)	õː	kõː¹	skom	to thirsty
	ɔN-	kɔ¹ŋgə¹	skom.gi	to thirsty (conjunct)
um(s)	õː	tsõː¹	btsum	to wink
	ɔN-	tsɔ¹ŋgə¹	btsum.gi	to wink (conjunct)

We only find three exceptions to these correspondences:

OT	Cone	Example	etymology	meaning
am	ĩː/əN-	nĩː¹, nə¹ŋgə¹	bsnams	to smell
om	oː	soː²	zom	bucket
em	ɛ	jɛ¹riː¹, jɛ¹kkə¹	g.yem (res)	to have sex

The vowel –oː in 'bucket' resembles the case of contracted syllables such as /tʰoː²/ 'hammer' <tho.ba> (see 2.2.5). The proto-Cone form was perhaps *zom.ba with subsequent fusion of the two syllables.

3.2.4 Other closed syllables

Apart from final stops and nasals, there were three final consonants in Old Tibetan : –r, –l and –s. The first two could cooccur with the *da-drag* in the complex codas –rd and –ld which however merged with their simple counterparts in Cone.

Final –r is the only final consonant to have been preserved in Cone. The correspondences are quite simple:

OT	Cone	Example	etymology	meaning
ar(d)	ær	tær²	dar	ice
er(d)	er	ser¹	gser	gold
ir(d)	ər	tsər¹	btsir	to pinch
or(d)	or	tor¹	gtor	to scatter
ur(d)	ər	mər¹	rmur	to gnaw

The final –r is sometimes resyllabified as the initial consonant of the next syllable in some compounds:

OT	Cone	Example	etymology	meaning
ar	æ.rV	mæ¹ruː¹	dmar.po	red
		kæ²ruː²	dkar.po	white
		sæ¹rə¹	gsar	young (person)
		ŋgæ²ræ¹	mgar.ba	blacksmith
		kæ²ræ¹	dkar.ba	lime
er	e.rV	sʰeː²ruː²	ser.po	yellow
or	ɔ.rV	sɔ²ræ¹	zor.ba	sickel

We also find a few isolated cases of irregular correspondences, with irregular vocalism and/or loss of final –r.

OT	Cone	Example	etymology	meaning
er	ær	jær¹mæ¹	g.yer.ma	Xanthoxylum
er	ɛ	sʰɛ²tʂɑ¹, ʂʰɛ²tʂɑ¹	ser.drag	hail
er	i	si², sə²kkə¹	zer	speak, talk
ir	e	hær²tɕe¹	phal.spyir	about
ar	eː	teː¹kæ¹	star.ka	walnut tree
ur	i	pi²lẽː²	ɦbur.len	plane

Note that the final –r of OT coming from the dative suffix –r (*la.don*) have entirely distinct correspondences that will be described in detail in section 3.

For final –l, the most common correspondences are the following:

OT	Cone	Example	etymology	meaning
al(d)	eː	peː²	bal	wool
	ɑː	gɑː²	brgal	to stride
el(d)	iː	tʂiː² lɑː²	brel lang	anxious
il(d)	iː	siː¹	bsil	cold
ol(d)	uː	juː¹	g.yol	cover
ul(d)	ʉː	zʐʉː¹	sbrul	snake

These correspondences resembles those of rhymes in final –ng, except for –el. For –al, –eː is more common but –ɑː is generally found with verbs. This double correspondence will be discussed in more detail in section 2.4. The rhyme –el is attested by only seven items, and presents three other correspondences, including one where OT final –l corresponds to –r in Cone:

OT	Cone	Example	etymology	meaning
el	i	tʰi¹	thel	seal
		ndʑi²	ɦbrel	chess
el	e/ɛC-	ndʑe², ndʑɛ²kkə¹	ɦgyel	to slip
el	er	ɲiː¹xʰer¹	dmyig.shel	glasses

The correspondence of –l to –r is found in some examples of the rhyme –al:

OT	Cone	Example	etymology	meaning
al	ær	riː²pær¹	rus.sbal	turtle
		ŋæ²dʑær¹	nga.rgyal	arrogant
		hær²tɕe¹	phal.spyir	about
al	æ.rV	dʑæ²ruː²	rgyal.po	king

We find two cases where final –l is resyllabified following the addition of a suffix:

OT	Cone	Example	etymology	meaning
el	iː.lV	tʂiː²lə¹	drel	mule
il	ə.lV	tɕə²lə¹	gril	round

Finally, the following marginal correspondences are also attested:

OT	Cone	Example	etymology	meaning
al	ãː	ɲãː², ɲãː²ɣə¹	nyal	to sleep
ol	ũː	ɲũː²	nyol	to sleep (imperative)

ol	oː	gɔ²joː¹	sgo.yol	tent fly
		dɔ²sʰoː²	rdo.sol	coal
il	ɪː	sʰɔ²ɲɪː¹	so.rnyil	gum
al	ɛC	kʰɛ²mmæ¹	mkhal.ma	kidney

The verb ɲãː² ‘to sleep’ is the only one in –ãː whose conjunct form is not –æN-, and its imperative form is one of the rare words with the vowel ũː. The expected reflexes of *nyal* and *nyol* would be *ɲɑː² and *ɲuː², that is the exact equivalents of ɲãː² and ɲũː² without nasality. All these facts suggest that nasality is secondary in this verb. This question will be explored in section 3.4.1.

The rhymes in final –s have the following correspondences:

OT	Cone	Example	etymology	meaning
as	eː	dzeː	bzlas	to speak (past)
es	ɪː	xʰɪː²	shes	to know
is	iː	ɕiː¹	dkris	to attach
os	ɪː	tɪː¹	ltos	to see (imperative)
us	iː	tɕiː¹	bkrus	to wash (past)

Since Old Tibetan has a past tense –s suffix, these rhymes commonly occur in the past tense forms open syllable stems. The resulting alternations will be studied in section 3. We observe various cases of irregular correspondences for these rhymes.

First, unexpected nasalization occurs in several nouns:

OT	Cone	Example	etymology	meaning
es	ĩː	nãː²xʰĩː¹	rnam.shes	soul
os	ĩː	ɲãː²ɣĩː²	nyal.gos	quilt
		pĩː¹	spos	incense
		tsʰĩː²	tshos	pigment

Second, various irregularities in vowel correspondences:

OT	Cone	Example	etymology	meaning
es	ə	ɣə²niː¹ lɔ²	gzhes.ning.lo	the previous year
es	iː	ɣiː²nãː²	gzhes.nangs	in one year
es	iː	ɣiː²	gzhes	to eat, honorific
es	iː	-riː	res	reciprocal suffix
os	ɔ	gɔ²	dgos	need
os	iː	ɕiː	byos	to do (imperative)
is	ə	kʰeː²rə¹	kha.spris	milk skin

The case of the verb ‘to do’ is particularly puzzling. Its complete paradigm is present ɕi²/ɕə²kkə¹, past ɕeː² and imperative ɕiː². From the OT paradigm *byed*, *byas*, *byos*, we would expect *ɕɪ²/ɕɛ²kkə¹, ɕeː² and *ɕɪː². See section 4.2 for an explanation.

The form gɔ² for ‘need’ reflects a proto-form *dgo with loss of final –s. Cone is not isolated in having an irregular development in this particular word; for instance, Labrang Amdo is hgo (Hua Kan, Longbojia 1993).

The noun kʰeː²rə¹ ‘milk skin’ is particularly interesting, as it attests resyllabification of the s– of the second syllable. We have to suppose a non-canonical form *kha.spri without final –s in proto-Cone. This form underwent the change *spr– > *sr– (see section 3.3.3), then s– was reinterpreted as the coda of the first syllable

*kha.spri > *kha.sri > *khas.ri, a proto-form which regularly yields kʰeː²rə¹. Had resyllabification not taken place, a form like *kʰæ²ʂə¹ would have been expected.

3.2.5 Contracted vowels

Contracted vowels result from the fusion of an open syllable vowel with the suffixes –ba, –bo, –mo or –ɦu. Only nouns present contracted vowels, as the verbal suffixes never merge with the stem vowels. All contracted vowel result in long vowels. Contraction of the –mo suffix results in a nasal vowel. These rhymes do not have a distinct conjunct form.

OT	Cone	Example	etymology	meaning
a.ba	ɑː	dzɑː	zla.ba	moon
e.ba	eː	teː¹	lte.ba	navel
e.bo	uː	sʰuː²	sle.bo	large basket
eɦu	iː	ʂiː¹	spreɦu	monkey
i.ba	eː	dʑeː²	lji.ba	flee
iɦu	eː	ɕeː²	byiɦu	mouse
i.mo	õː	rõː²	ri.mo	mark
o.ba	oː	loː¹	glo.ba	lung
o.ba	uː	zuː²	bzo.ba	carpenter
o.mo	õː	ndzõː²	mdzo.mo	hybrid yak cow
u.ba	oː	joː²	yu.ba	handle

Note that Old Tibetan o.ba can become either /oː/ or /uː/ in Cone, the latter correspondence only attested in one example.

The contracted forms of o.ba and u.ba are the only origins of the long vowel /oː/, which is quite rare in the Cone lexicon.

3.3 Onsets

Old Tibetan had a complex consonantal system with at least 210 distinct possible onsets. The complex clusters of Old Tibetan, presenting in some cases as many as four initial consonants, have been reduced in all Tibetan languages, and are only partially preserved in Western Tibetan and Old Tibetan loanwords in Rgyalrong languages. All initial consonant clusters have disappeared in Cone.

Another major difference between OT and all attested Tibetan languages is the status of aspirated obstruents. In Old Tibetan, aspirated and non-aspirated voiceless stops were in complementary distribution (see Li 1933). Hill (2007) shows that in OT orthography, aspiration was not written consistently, and was still a subphonemic feature, though the basic tendency was that aspirated stops occurred word-initially and after nasal preinitials, while non-aspirated ones occurred after any non-nasal preinitial. Later, non-aspirated voiceless stops were introduced in the systems by loanwords from Chinese or Indic, enclitics, onomatopoeia or dialectal words.

The structure of the onset in Old Tibetan was the following:

$(C^1C^2)C^3(C^4)V$

Only C^3 was obligatory. We call this position the true initial (in Tibetan *ming.gzhi*). C^4

(the medial consonant or *ɦdogs.can*) could be any of {r l w y}. C¹ (the *sngon-ɦjug* preinitial) could be any of {b d g m ɦ} (note that ɦ in preinitial position represents a homorganic nasal), while C² (the *mgo.can* preinitial) could be any of {r l s}.

3.3.1 Onsets without medials: stops.

The basic correspondences of onsets without medials in monosyllables are relatively regular. We will discuss stops, fricatives, nasal and non-nasal sonorant respectively. In the following discussion, the symbol C presents any of {b d g r l s}, N either ɦ or m in Old Tibetan. The correspondences set out in this section are not valid for suffixes, which will be studied in a distinct section.

For stops, the correspondences are the following:

OT	Cone	Example	etymology	meaning
(C)Ck	k¹	kor¹	skor	to turn (tr.)
kh	kʰ	kʰə¹	khu	soup
Nkh	kʰ	kʰær¹	mkhar	wall
g	k²	kẽː²	gon	to wear
(C)Cg	g²	gæ²	dga	to like
Ng	ŋg²	ŋgɔ²	mgo	head
(C)Cc	tɕ¹	tɕi¹	gcig	one
ch	tɕʰ	tɕʰə¹	chu	water
Nch	tɕʰ	tɕʰeː²	mche.ba	fang
j	tɕ²	tɕæ²	ja	tea
(C)Cj	dʑ²	dʑɛ²	rje	to exchange
Nj	ndʑ²	ndʑɛ²	mje	penis
(C)Ct	t¹	tãː¹	gtam	to talk
th	tʰ	tʰʉː²	thung	short
Nth	tʰ	tʰʉː²	ɦthung	to drink
d	t²	tær²	dar	ice
(C)Cd	d²	dʉː²	rdung	to hit
Nd	nd²	ndʉː²	mdung	spear
(C)Cts	ts¹	tsə¹	rtsi	to count
tsh	tsʰ	tsʰɛ¹	tshe	life
Ntsh	tsʰ	tsʰɔ¹	mtsho	lake
(C)Cdz	dz²	dzə²	rdzi	to knead
Ndz	ndz²	ndzɔ²	mdzo	hybrid yak
(C)Cp	p¹	pʉː¹	dpung	to stack
ph	pʰ	pʰe¹	phebs	to walk
Nph	pʰ	pʰər¹	ɦphur	to fly
b	p²	peː²	bal	wool
(C)Cb	b²	beː²	sbas	to bury
Nb	mb²	mbə²	ɦbu	worm

These correspondences explain why voiced stops only occur with the low tone: there is no historical origin for a high tone voiced stop; the tonal contrast only exists for unvoiced non-aspirated stops, where high tone reflects an original unvoiced stop, and

low tone an original voiced stop without preinitial. For aspirated consonants, we have seen in 2.3 that tone was not contrastive.

In a few examples, the Old Tibetan preinitial is preserved intervocalically:

OT	Cone	Example	etymology	meaning
rts	Vr.ts	nær¹tsɛ¹	sna.rtse	tip of the nose
		kʰær²tsɑ_¹	kha.rtsang	yesterday
		mær²tsæ¹	ma.rtsa	capital (money)
dg	Vr.g	tɕər²gə¹	bcu.dgu	nineteen

A recurrent irregular correspondence is Cone h– for Old Tibetan ph-. We will see in section 3.4 that this is a characteristic of Amdo Tibetan borrowings:

OT	Cone	Example	etymology	meaning
ph	h	hu¹, hɔ²qqə¹	phog	to hit (the target)
		hi¹	phud	to take off (clothes)
		hær²tɕe¹	phal.spyir	about

Intervocalically, we often find aspirated or fricatives in Cone corresponding to non-aspirated in standard Tibetan orthography and vice-versa:

OT	Cone	Example	etymology (in standard orthography)	meaning
c	tɕʰ	ræ²tɕʰɔ¹	rwa.co	horn
		sʰẽː²tɕʰẽː¹	sems.can	animal
		næ²χtɕɑ¹	nag.chags	wife
kh	ɣ	næ¹ɣʉː¹	sna.khung	nostril
ch	c	ɲiː¹tɕə¹	mig.chu	tear
		tʰɛ²tɕẽː¹	mthe.chen	thumb
k	kʰ	ɕæ²ŋkʰə¹	spyang.ki	wolf

These examples are not exceptions *stricto sensu*, they rather reflect the fact that Cone originates from an Old Tibetan dialect slightly different in this respect from the one represented in the classical orthography. For ‘tear’ for instance, we must reconstruct a proto-Cone *dmyig.cu instead of <mig.chu>.

Finally, we find the following isolated exceptions:

OT	Cone	Example	etymology	meaning
dp	x	ɲɛ¹xõː¹	me.dpung	torch
sb	ʐ̩¹	ʐ̩õː¹, ʐ̩ɔ¹ŋgə¹	sbom (*sbrom)	thick
b	mb	mbʉː²wãː¹	bung.ba (*ɦbung.ma)	bee
ɦb	p	pi²lẽː²	ɦbur.len	plane
gc	ts	tɕə²tsi¹	bcu.gcig	eleven
bts	dz	dzæ²	btsa	rust
tsh	sʰ	kʰə²sʰər¹	khu.tshur	fist
rg	ŋg	ŋgãː²	rgang	hedgehog

Some of the examples above reflect borrowings from other dialects (such as ‘torch’) and will be studied in 3.4. The case of ʐ̩õː¹, ʐ̩ɔ¹ŋgə¹ ‘thick’ however, is different. The Cone initial ʐ̩– with a high tone only has two origins: sbr– and sgr– in OT. This shows that proto-Cone differed from attested OT in having a form *sbrom instead of *sbom* in this word, with a *-r– infix. A similar situation is observed for the noun ‘bee’, which

must be reconstructed *ɦbung.ma in proto-Cone. Other dialects have a prenasalized in this word such as Shuiluo Kami Tibetan mbõ², a form whose proto-etymon is *ɦbuŋ.mo (personal fieldwork).

3.3.2 Onsets without medials: fricatives and sonorants

Old Tibetan had only five fricatives, the alveolo-palatals /ɕ/ and /ʑ/ (transcribed <sh> and <zh>), the dentals /s/ and /z/ and the laryngeal /h/ and /ɦ/. Cone, as we have seen, has developed a much more complex system of 13 fricative phonemes.

OT fricatives remain fricatives in Cone, but alveolo-palatals change to velars:

OT	Cone	Example	etymology	meaning
sh	xʰ	xʰɑː²	sha.ba	deer
Csh	x¹	xɑ¹	bshags	to tear
zh	x²	xɔ²	zho	curd
Czh	ɣ²	ɣær²	gzhar/bzhar	to shave
s	sʰ	sʰɔ¹	so	tooth
Cs	s¹	sɔ¹	gso	to raise
z	s²	sɔ²	zo	to eat (imperative)
Cz	z²	zɑː²	bzang	good
h	h	hæ² kɔ²	ha.go	to understand
ɦ	j/w?			

Note that there is no origin in Old Tibetan for /ɣ/ and /z/ with a high tone, a fact which explains why these fricatives always occur with a long tone. The other voiced fricatives /ʑ/ and /ʐ/ have other origins.

For OT /ɦ/, there is no straightforward correspondence. Here are all the examples in our Cone corpus:

OT	Cone	Example	etymology	meaning
ɦ	w	wõː²mbæ¹	ɦon.pa	deaf
ɦ	j	jɔ²ʁæ¹	ɦog	below
ɦ	-	ɛ²kkæ¹	ɦug.pa	owl
		õː¹wãː¹	ɦo.ma	milk

We find a handful of examples where OT alveolo-palatals correspond to Cone alveolo-palatals, retroflex or dental fricatives instead of velar:

OT	Cone	Example	etymology	meaning
bsh	ɕ¹	ɕɪː¹	bshos	to give birth to
bzh	ɕ²	ɕõː²	bzhon	to ride
sh	xʰ	lʉː¹ɕʰær¹	*rlung.shar	to winnow
gsh	ʂ¹	ʂɔ¹qqæ¹	gshog.pa	wing
zh	ʂ²	ʂɔ²qqæ¹	zhags.pa	lasso, noose

We will see in 3.4 that these are borrowings from other Tibetan dialects.

The noun xʰæ²mbæ¹ ‘butcher’ <gshan.pa >is the only case of an aspirated fricative in Cone corresponding to an initial cluster /stop+fricative/ in Old Tibetan.

For nasals, the correspondences with OT are extremely straightforward (C indicates here any consonant, even a nasal):

OT	Cone	Example	etymology	meaning
m	m²	mɔ²	mo	divination
Cm	m¹	mæ¹	dma	low
n	n²	nʉ²	nub	west
Cn	Cn	nɔ¹	rno	sharp
ny	ɲ²	ɲæ²	nya	fish
Cny	ɲ¹	ɲiː¹wæ¹	rnying.ba	old
ng	ŋ²	ŋɔ²	ngo	face
Cng	ŋ¹	ŋʉː¹	dngul	silver

The only major exceptions involve the tonal irregularities discussed in 3.1. Note that OT /m/ corresponds to /ɲ/ before front vowels, a fact which reflects the general palatalization of labials and velar before front vowel in eastern Old Tibetan, reflected in the OT spelling system.

Note the exceptional form /ɲeː²/ ‘barley’ <nas> and /ɲeː²ŋgɔ¹/ ‘pillow’ <sngas.mgo> with a palatalized initial. OT n– and ng– do not normally palatalize before –e or –as in Cone (for instance /neː¹/ ‘element of the loom’ <snas>). We find a similar irregularity in Shuiluo Kami where the reflex of <nas> is ɲɛ². It is unclear whether we have to postulate a non-standard etymon *nyas ‘barley’ in proto-Cone and proto-Kami, or alternatively suppose that this palatalization is a characteristic of the inherited layer, a hypothesis which would imply that that all cases of non-palatalized nasals before –eː in Cone were borrowed from another Tibetan language.

For non-nasal sonorants, we find the following correspondences:

OT	Cone	Example	etymology	meaning
r	r²	rə²	ri	mountain
sr	ʂ¹	ʂe¹	srab	bridle
hr	ʂʰ	ʂʰeː²	hral	coarse
l	l²	leː²	las	fate
Cl	l¹	lʉː¹	rlung	wind
sl	ts¹	tsɑː¹	bslang	to beg for money
zl	dz²	dzɑː²	zla.ba	moon
rl	ɬ	ɬə²kkæ¹	rlig.pa	testicles
lh	ɬ	ɬæ¹	lha	god
y	j²	jɑː²	yang	light (adj)
g.y	j¹	jɑ¹	g.yag	yak
ɦw	w	wæ²	ɦwa	fox

We find the following irregular words (see section 3.4 for discussion):

OT	Cone	Example	etymology	meaning
lh	h	hæ²ndʑu¹	lham.ɦgrog	bootlace, shoelaces
		hæ²ŋŋɔ¹	lham.ngo	sole of boots
sl	s	sæ¹ŋæ¹	sla.nga	pan
sl	sʰ	sʰuː²	sle.bo	large basket
sl	l¹	læ¹, leː²	sla, bslas	to spin
zl	d	dæ² ndzĩː²	zla.ɦdzin	lunar eclipse

sr	s	sɛ¹wõː¹	sre.mong	weasel
		ɛ¹sɛ¹	srin	cotton

3.3.3 Onsets with –r– medial

The consonant clusters with a medial –r– in Old Tibetan included velar, dental and labial stops + r; the cluster sr– was treated in section 3.3.2.

Velar stops have two sets of correspondences. In the first one, /velar+r/ clusters correspond to alveolo-palatals, except for sgr-:

OT	Cone	Example	etymology	meaning
(C)Ckr	ɕ¹	ɕæ¹	skra	hair
khr	tɕʰ	tɕʰɑ¹	khrag	blood
Nkhr	tɕʰ	tɕʰi¹	ɦikhrud	to wash
gr	tɕ²	tɕɔ²	gro	wheat
(C)sgr	ʐ¹	ʐiː¹	sgril	to cause to roll
Ngr	ndʑ²	ndʑãː²	ɦgram	shore, bank

In the second one, /velar+r/ correspond to retroflex affricates instead; note that we have no examples of (C)kr– onsets in this set:

OT	Cone	Example	etymology	meaning
khr	tʂʰ	tʂʰõː²tʂʰõː¹	khrung.khrung	white crane
Nkhr	tʂʰ	tʂʰiː²wæ¹	mkhris.ba	gallbladder
gr	tʂ²	tʂõː²ntɕʰer¹	grong.khyer	city
dgr	dʐ²	dʐæ²wuː¹	dgra.bo	enemy
(C)sgr	dʐ²	dʐæ²	sgra	sound
Ngr	ndʐ²	ndʐɯː²wæ¹	ɦgrul.pa	guest

The origin of these two sets of correspondence will be studied in section 3.4. We also have one example of bkr– corresponding to tɕ– instead of expected ɕ– (tɕiː¹ ‘to wash (past)’ <bkrus>). We will see in section 4 that this form is analogical with the regular present tɕʰi <ɦikhrud>.

For dental and labial stop clusters, the correspondences are the following:

OT	Cone	Example	etymology	meaning
dr	tʂ²	tʂẽː²	dran	to miss, to think of
Ndr	ndʐ²	ndʐɛ²	ɦdre	ghost
spr	ʂ¹	ʂĩː¹	sprin	cloud
phr	tʂʰ	tʂʰɑ²ŋgɔ¹	*phrag.mgo	shoulder
Nphr	tʂʰ	tʂʰu¹	ɦphrog	to rob
br	tʂ²	tʂɑ²	brag	cliff
sbr	ʐ¹	ʐɯː¹	sbrul	snake
Nbr	ndʐ²	ndʐeː²	ɦbras	rice

Note that sbr– and sgr– both develop into the voiced fricative /ʐ/ with a high tone. The word ʐõː¹ ‘thick’ also belongs to this set, though the corresponding OT form is *sbom*. We must reconstruct an alternative etymon *sbrom to account for it. For spr– and sbr-, we have to suppose intermediate changes:

spr– > *sr– > ʂ

sbr– > *zbr > *zr > ʐ

We find the following irregularities with labial and dental+r clusters:

OT	Cone	Example	etymology	meaning
sbr	dʐ	dʐã:²tsə¹	sbrang.rtsi	honey
sbr	w	wæ²	sbra	tent
spr	tʂ	tʂə²	spri	beastings
spr	p	pɑ:¹wu:¹	sprang.po	beggar
ɦbr	ndʑ	ndʑi²	ɦbrel	chess
dr	r	ŋæ²rɔ²	snga.dro	morning

In the first three examples, the clusters /spr/ and /sbr/ change into affricates or stops, not into fricatives.

3.3.4 Onsets with –y– medial

Old Tibetan clusters with medial –y– only included velar and labial stop+y. The correspondences between OT and Cone are the following:

OT	Cone	Example	etymology	meaning
(C)Cky	ɕ¹	ɕɑ:¹	bskyal	to send
khy	tɕʰ	tɕʰə²ɣə¹	khyi	dog
Nkhy	tɕʰ	tɕʰæ²qqæ¹	ɦkhyags.pa	ice
(C)Cgy	dʑ²	dʑe²	rgyab	back
Ngy	ndʑ²	ndʑɔ²qqɔ¹	mgyogs.po	quick
spy	ɕ ʔ	ɕæ²ŋkʰə¹	spyang.ki	wolf
phy	ɕʰ	ɕʰi:²	phyis	to wipe (past)
Nphy	ɕʰ	ɕʰe:²	ɦphyi.ba	marmot
by	ɕ²	ɕæ²	bya	bird
dby	j¹	jær¹kæ¹	dbyar.ka	summer
sby	ʑ²	ʑær²	sbyar	to paste
Nby	ndʑ²	ndʑer²	ɦbyed	to open (present

Note that the clusters /labial+y/ are the only regular origins of alveolo-palatal fricatives. This explains the absence of /ʑ/ with high tone, which would have no origin in Old Tibetan.

We find the following isolated exceptions to the correspondences set out above:

OT	Cone	Example	etymology	meaning
sky	tɕ	tɕæ¹gæ¹	skya.sga	ginger
		tɕæ¹qqæ¹	skyag.ka	excrement
sky	j	pĩ:¹jæ¹	spun.skya	brother
rky	tɕ	tɕe:¹	rkyal	to swim
sby	ɣ	ɣĩ:²	sbyin	to give
by	ʑ	ʑə²ppæ¹	byin.pa?	calf (of the leg)
spy	tɕ	hær²tɕe¹	phal.spyir	about
phy	xʰ	xʰə²zɔ¹	phyi?	outside
phy	tɕʰ	tɕʰə²ræ¹	phyu.ra	cheese

Of the four medials of OT, only –r– and –y– need to be specially discussed; the

clusters with –l– as a second element have been treated in 3.3.2 and the medial –w– (*wa-zur*) has not left any trace in Cone (on the nature of the *wa-zur*, see Hill 2006 and Jacques 2009).

3.4 The layers of vocabulary

Sections 3.2 and 3.3 have shown that the correspondences between Old Tibetan and Cone present irregularities and that for in some cases we even seem to have a split between two sets of correspondences. The most important cases are:

		Set 1	Set 2
A	Vng	long vowel ɑː eː iː uː ʉː	nasal vowel ãː ĩː õː
B	al	ɑː	eː
C	ph	p^h	h
D	lh	ɬ	h
E	alveolo-palatals fricatives	velars	alveolo-palatals
F	velar+r	alveolo-palatal affricates tɕ $t\text{ɕ}^h$ dʑ ndʑ and ʐ	retroflex affricates tʂ $t\text{ʂ}^h$ dʐ ndʐ
G	Cky, labial+y	ɕ/ɕ^h	tɕ/$t\text{ɕ}^h$
H	final l	long vowel	r

Although we have seen that Cone comes from a non-standard dialect of Old Tibetan that had uncommon forms (such as *sbrom ‘thick’ instead of <sbom>), we have no reason to postulate that these split correspondences originate from pre-OT contrasts lost in the written corpus but preserved in one. Instead, the only reasonable assumption is that these reflect distinct layers of vocabulary, one inherited from OT, and the other borrowed from a neighbouring Tibetan dialect.

We cannot assume that the most common correspondence always reflect the inherited layer. Instead, the following criteria can be used:

a) Since nouns are more easily borrowed than verbs, we should expect that only few verbs should appear in a borrowed layer of vocabulary.
b) The borrowed layers should contain more cultural and religious vocabulary.
c) Any form that reflect a proto-etymon different from that of the written corpus of Old Tibetan (such as ʐõː¹ ‘thick’ *sbrom quoted above) is not likely to have been borrowed.

Since the onset and the rhyme of any syllable must belong to the same layer of vocabulary (see Sagart and Xu 2001 about Chinese dialects), this implies that by linking the correspondences of onsets and rhymes, we can systematically analyse the layers of borrowing and study the ordering of the sound changes.

We will discuss mainly sets A, B and F, for which we have an important quantity of examples. C, D and H will be studied in 3.4.2 alongside the B set, and E and G will be discussed in 3.4.4.

3.4.1 Rhymes in velar nasal

The rhymes in velar nasal of Old Tibetan correspond either to long vowels or nasal vowels.

The long-vowel correspondence set includes too many examples to be cited here exhaustively. We find many verbs in this layer:

OT	Cone	Example	etymology	meaning
ang	ɑː	dɑː²	gdang	to open (the mouth)
		tɕɑː¹	bcang(s)	to hold tight
ing	iː	tiː¹	bting(s)	to spread
		ʂiː¹	sring	to stretch out
ong	uː	tsuː¹	btsong(s)	to sell
		tʰuː²	mthong	to see
ung	~~ʉ~~ː	tʰ~~ʉ~~ː²	ɦthung	to drink
		d~~ʉ~~ː²	rdung	to hit

The rare rhyme –eng is only attested in the word tʰɔ²reː² ‘tomorrow’ <tho.rengs> in this layer.

Here is the list of all words with nasal vowels:

OT	Cone	Example	etymology	meaning
ang	ãː	hæ²jãː²	ha.yang	aluminium
		ɕãː²	byang	north
		nãː²	nang	inside
		ndãː²	mdang.nub	last night
		ŋgãː²	rgang	hedgehog
		ŋãː²wæ¹	ngang.ba	swan, goose
		tɕãː¹wãː¹	lcang.ma	willow
		mə²nãː¹	mi.snang	not to be
		dʑãː²kə¹	ljang.ku	yellow
		jãː¹zær¹	g.yang.gzar	steep cliff
		dʐãː²tsə¹	sbrang.rtsi	honey
		sʰɑː²nãː²	*sang.gnam	next year
		mãː², mɑː²ɣə¹	mang	many
		tʂãː²wõː¹, tʂɑː²ɣə¹	drang	straight
eng	ãː	kãː²sʰãː¹	gangs.seng	leopard
ing	ãː	ndzãː²lãː¹	ɦdzam.gling	world
		dzãː²wə¹	rdzing.bu	pool
ing	ĩː	tɕʰə²xĩː²	chu.zhing	field
		xʰĩː²	shing	timber
		ɲĩː¹	ming	name
ong	õː	tɕɔʁ²rõː²	grog.rong	valley
		sʰæ²tõː¹	sa.dong	cave
		rõː²wæ¹	rong.ba	farmer
		kʰõː²wæ¹	khong	pocket
		sɛ¹wõː¹	sre.mong	weasel
ung	õː	ɲɛ¹xõː¹	me.dpung	torch
		tʂʰõː²tʂʰõː¹	khrung	white crane
		sõː¹	gsungs	speak, talk (honorific)

Only one verb is found in this list (sõː¹ <gsungs>) and it is an honorific form.

This mere fact strongly suggests that the nasal vowel correspondence reflects the borrowed layer. This is confirmed by the presence of recent words such as ‘aluminium’, and the important proportion of dissyllables.

We notice that the rhyme –ing corresponds either to –ãː or –ĩː, a feature which reflects different layers of borrowings. The correspondence –ing to –ãː must reflect recent loanwords from Amdo Tibetan, where OT –ing changes to –aŋ (<ɦdzam.gling> is Labrang *ndzamhlaŋ*, Hua Kan and Longbojia 1993).

The words sɛ¹wõː¹ ‘weasel’, ɲɛ¹xõː¹ ‘torch’ and tʂʰõː²tʂʰõː¹ ‘white crane’ likewise present additional correspondences characteristic of loanwords: sr– > –s (instead of regular ʂ-), dp– > x– (a typical Amdo sound change) and khr– > tʂʰ– (see 3.4.3).

However, not all words with nasal vowels corresponding to velar nasal rhymes are borrowed. The two adjectives mãː² ‘much’ and tʂãː²wõː¹ ‘straight’ have exceptional conjunct forms in –ɑː (-ãː normally alternates with –æN-), mɑː²ɣə¹ and tʂɑː²ɣə¹ respectively. The nasality here might be secondary: we have seen that many lexical items, such as ɲãː² ‘to sleep’ <nyal>, pĩː¹ ‘incense’ <spos> have non-etymological nasality, which probably results from the fusion with a suffix in nasal. This is also the case for mãː² and tʂãː²wõː¹: in the latter, nasality most probably spread from the suffix –wõː.

Other monosyllabic nouns with nasal vowel may also belong to the inherited layer. First, ɲĩː¹ ‘name’ from a non-attested *Cmying: the irregular high tone would not be expected if it were a borrowing. Second, ŋgãː² ‘hedgehog’, which ought to come from *ɦigang rather than attested <rgang>. Third, xʰĩː² ‘wood’ <shing> could also potentially belong to the inherited layer, though this remains uncertain.

The bisyllabic word sʰɑː²nãː² ‘next year’ goes back to an unattested compound *sang.gnam rather than <sang.gnangs> ‘tomorrow and after tomorrow’. According to Sagart and Xu’s (2001) *Extended principle of coherence*, both syllables of a dissyllable belong to the same layer, unless it is not inherited and has been recreated from each syllable at a later period. Although this principle was formulated about Chinese data, it is still generally valid when dealing with other Sino-Tibetan languages. Under this principle, the OT rhyme –ang cannot correspond to both the inherited layer –ɑː and the borrowed layer –ãː in the same word.

3.4.2 The rhyme –al

In the case of the rhyme –al, it is slightly more difficult to determine which layer is borrowed and which is inherited.

The correspondence –al to Cone –eː is the most common one, and appears in the following examples:

Example	etymology	meaning
peː²	bal	wool
seː¹	gsal	bright
ndʑeː²	ɦjal	to compensate
ʂʰeː²	hral	coarse, crude
tsʰeː², tseː¹	ɦtshol; btsal	to search
ndʑeː²	mjal	to worship

reː²wæ¹	ral.ba	plait
dʑeː²	rgyal	to win
tɕeː¹	rkyal	to swim
beː²wæ¹	sbal.pa	frog
geː²riː²	sgal.rus	backbone
sʰɪː²deː²	sos.dal	slow, late
tʰeː²	thal	ashes

The correspondence –al : –ɑː, on the other hand, is only attested in a handful of examples:

Example	etymology	meaning
ɕɑː¹, ɕuː¹	bskyal	to send
mbɑː², pɑː², puː²	ɦbal	raise, pull
gɑː², guː²	brgal; brgol	to stride

We find verbs in both sets: this criterium cannot be used to determine which layer is inherited.

We propose here that the correspondence –al : –ɑː reflects the inherited layer, in spite of being less common than the other one. The evidence for this idea is the following.

First, the verb mbɑː², pɑː², puː² ‘to pluck out’ <ɦbal, bal, bol> is a denominative verb from <bal> ‘wool’, whose original meaning is ‘to pluck wool/feathers’. In Cone, this verb can be used for anything, including plants, and its original narrow meaning was considerably extended. Since this verb does not exist with this meaning in Amdo Tibetan, it is unlikely that it is a loanword.

Second, the verb tɕeː¹ ‘to swim’ <rkyal> presents the correspondence Cky– : tɕ-, which we will show is a characteristic of loanwords in 3.4.4, while ɕɑː¹ ‘to send’ has the inherited Cky– : ɕ-.

Third, some of the verbs in the first set have a semantics that is clearly non-basic: ‘to swim’ is not an everyday activity in Cone, and ‘to worship’ belongs to the Buddhist vocabulary.

Finally, the OT rhymes –il, –ol and –ul evolve like their counterpart in velar nasal to –iː, –uː and –oː respectively. An evolution –al > –ɑː merging with –ang is therefore more likely for the inherited vocabulary than –al > –eː. This argument is weakened however by the fact that –eː is not a reflex of Cone –el.

The correspondence –al to –eː occurs in one compound with –ang to –al : ʐɑː¹tʰeː¹ ‘maggot’ *sbrang.thal. In view of the extended principle of coherence (henceforth ECP, see 3.4.1), this form can be interpreted in three ways. First, the compound was created in proto-Cone and inherited; this would imply that –al : –eː instead of –al to –ɑː is the inherited correspondence, an idea which we have already rejected. Second, this word was borrowed from another Tibetan dialect after the change –al > –ɑː but before –ang > –ɑː. In this view, the loss of –l and –ng did not occur at the same time in proto-Cone. Third, this compound was created in a later stage in Cone from an inherited root and a borrowed one, and constitutes an exception to the EPC. This last hypothesis is the most probable; the compound *sbrang.thal is

not attested in OT or in CT and it is still analysable synchronically as ‘fly ash’, perhaps to be understood as ‘fly dirt’.

We find an additional correspondence of OT final –l to Cone –r. The examples are the following:

Example	etymology	meaning
ɲiː¹xʰer¹	dmyig.shel	glasses
riː²pær¹	rus.sbal	turtle
ŋæ²dʑær¹	nga.rgyal	arrogant
hær²tɕe¹	phal.spyir	about

This represents a second layer of borrowing more recent than –al to –eː. It includes both recent technical innovations (glasses) which did not exist before the 20th century in Tibetan areas, and the word ‘about, approximately’. This word is especially interesting, as it also presents the correspondence ph– to h-, a feature of Amdo Tibetan, which confirms its status as a loanword. The correspondence –ir to –e was not mentioned in 3.3, but it is not irregular: it is the regular form of the dative of OT –i stems, and will be described in section 4.

Cone words that have h– for OT ph– and lh– instead of pʰ– and ɬ– belong to the same late layer of Amdo loanwords.

3.4.3 Stop+r

The clusters /velar+r/ of OT can correspond either to alveolo-palatals or retroflex affricates. The former is by far the most common, and we cannot provide an exhaustive list of all the examples. Here is a representative list with verbs:

OT	Cone	Example	etymology	meaning
skr	ɕ¹	ɕɑ¹	skrag	to be afraid
ɦkhr	tɕʰ	tɕʰi¹	ɦkhrid	to lead
gr	tɕ²	tɕɑ²	grags	to growl
ɦgr	ndʑ²	ndʑɔ²	ɦgro	to go
sgr	ʐ¹	ʐɻː¹	sgril	to roll (tr)

The correspondences to retroflex affricates are slightly less common. Here are all the attested examples:

OT	Cone	Example	etymology	meaning
khr	tʂʰ	tʂʰõː²tʂʰõː¹	khrung.khrung	white crane
		tiː²tʂʰɔ¹	de.khrod	in the future
ɦkhr	tʂʰ	tʂʰʉ¹, tʂʰə²kkə¹	ɦkhrid	to teach
mkhr	tʂʰ	tʂʰiː²wæ¹	mkhris.pa	gallbladder
gr	tʂ	tʂõː²ntɕʰer¹	grong.khyer	town
		tʂæ²wæ¹	grwa.ba	monk
dgr	dʐ	dʐæ²wuː¹	dgra.bo	enemy
sgr	dʐ	dʐæː	sgra	sound
ɦgr	ndʐ	ndʐə²kkə¹	ɦgrig	correct, right
		ndʐɻː²	ɦgril	to roll
		ndʐẽː²dər¹	ɦgran.sdur	to compete

ndʐiː²luˀ	*ɦgrel.log	to roll	

The correspondence of clusters to retroflex affricates is obviously the one which represents the borrowed layer. Three pieces of evidence support this idea.

First, words with retroflex affricates corresponding to /velar+r/ clusters also present the correspondence of rhymes with final velar nasal in OT to nasal vowel in Cone, which we have shown in 3.4.1 to be a characteristic of words borrowed from another Tibetan language.

Second, this layer contains cultural words such as 'monk' and 'town', which could easily be borrowed.

Third, we observe exceptional vowel correspondences with the words 'to teach' and 'guest', not found with the rest of the vocabulary and suggestive of a special layer of borrowing.

Two clusters with labial stops, spr– and sbr-, also present divergent correspondences:

OT	Cone	Example	etymology	meaning
spr-	ʂ-¹	ʂiː¹	spreɦu	monkey
		ʂĩː¹	sprin	cloud
		ʂɑː¹	spra.ba	tinder
	p-¹	pɑː¹wuː¹	sprang.po	beggar
	tʂ-¹	tʂə¹	spri	beastings
sbr-	ʐ-¹	ʐə¹kkə¹	sbrid.gi	pungent
		ʐʉː¹	sbrul	snake
		ʐɑː¹	sbrang	fly
	dʐ-²	dʐãː²tsə¹	sbrang.rtsi	honey
	w-²	wæ²	sbra	tent

The inherited forms here are those where the clusters correspond to retroflex fricatives ʂ-¹ and ʐ-¹. The correspondences to retroflex affricates are borrowings, in view of the fact that dʐãː²tsə¹ <sbrang.rtsi> exemplifies the borrowed correspondence –ang : –ãː (see 3.4.1). spr– : p– and sbr– to w– represent another layer of borrowing.

3.4.4 Alveolo-palatals

Most of the alveolo-palatal fricatives of Cone Tibetan come from dkr-, skr– or /stop+y/ clusters (see 3.3.4), while ancient alveolo-palatals became velar fricatives (examples are too numerous to give an exhaustive list).

We observe however two examples where they correspond to Cone alveolo-palatals instead: ɕɪː¹ 'to give birth to' <bshos> and ɕõː² 'to ride' <bzhon>. Although both are verbs, we have a piece of evidence showing that these are loanwords: the fact that 'to ride' also presents the otherwise unattested correspondence –on : –õː which runs counter to the fact that OT rhymes with final –n evolve as front vowels in Cone.

Additionally, we find two examples of nouns with OT alveolo-palatals corresponding to retroflex instead (ʂɔ¹qqæ¹ 'wing' <gshog.pa> and ʂɔ²qqæ¹ 'lasso' <zhags.pa>). This reflects an even more recent set of borrowings, perhaps from another Cone dialect (the data in Qu 1962 and Yang 1996 show that other Cone

dialects have retroflex fricatives corresponding to OT alveolo-palatal fricatives).

Clusters such as Cky and Cpy– normally give an unvoiced alveolo-palatal fricative in Cone. Only four counterexamples are found:

OT	Cone	Example	etymology	meaning
sky	tɕ	tɕæ¹gæ¹	skya.sga	ginger
		tɕæ¹qqæ¹	skyag.ka	excrement
rky	tɕ	tɕeː¹	rkyal	to swim
spy	tɕ	hær²tɕe¹	phal.spyir	about

This list includes the dissyllable'about', which we have shown is clearly a borrowing due to the correspondence of the first syllable –al : –ær and pʰ– : h-. This shows that this set of correspondences clearly reflect a borrowed layer. It also contains 'to swim', which has the correspondence –al to –eː, characteristic of a borrowed layer according to our discussion in 3.4.2. However, since we have already used this example as one of the arguments to show that –al to –eː is not the inherited layer, it would be circular to use it here to show the same of Cky– : tɕ-. The first example 'about' is sufficient for this purpose.

3.5 The inherited layer

In the preceding section 3.4, we have shown how to distinguish inherited words from borrowings in Cone by using phonetic correspondences. We did not provide principled arguments for minor correspondences only attested by one or two examples. We will assume in the present section that whenever an OT rhyme or initial has two or more correspondences, any correspondence attested by only one or two examples either reflects a borrowed layer or a non-standard proto-Cone form.

3.5.1 Rhymes

Based on this assumption and the discussion in 3.4 into account, the correspondences of OT rhymes in the regular inherited vocabulary of Cone in the last syllable of a word (not including the conjunct forms) are the following:

	Ø	b	d	g	m	n	ŋ	r	l	s
a	æ	e	e	a	ã	ẽ	ɑː	ær	ɑː	eː
e	ɛ	ɪ / e	ɪ	a	ẽ	ẽ	eː	er	iː ?	ɪː
i	ə	ʉ	i	i	ĩ	ĩ	iː	ər	iː	iː
o	ɔ		ɪ	u	õ	ẽ	uː	or	uː	ɪː
u	ə	ʉ	i	ʉ	õ	ĩ	ʉː	ər	ʉː	iː

For –eb, –ob and –el, for which examples are too few in our corpus, some doubts remain as to which correspondence is the inherited one. Short and nasal vowels have conjunct forms when followed by a syllable:

Base form	Conjunct form
ɑ	æk
e	ɛC
ɪ	ɛC

i	əC
u	ɔk
ʉ	əC
ãː	æN
ẽː	ɛN
ĩ	əN
õː	ɔN

These conjunct forms are always predictable, except for some stems in ãː have an irregular conjunct forms ɑː or do not alternate. The final consonants –k, –C and –N of the conjunct forms represent preservation of the OT final consonants in intervocalic position. Note that except for –ag/-eg and –og, all stops merge as C, and all vowels as ɛ or ə in conjunct forms.

These morphophonemes have the following reflexes depending on the following syllable (some of the evidence will be provided in 4.1):

	unvoiced obstruent	non-nasal voiced consonant	nasal	vowel
-k	χp, χt, χk	ʁb, ʁd, ʁg	ʁm, ʁn	ʁ
-C	gemination pp, tt, kk	disappears	gemination mm, nn, ŋŋ	ɣ
-N	prenasalization mp, nt, ŋk	prenasalization mb, nd, ŋg	gemination mm, nn, ŋŋ	n

In order to account for the changes from Old Tibetan to attested Cone, we propose the following line of evolution in eight major steps. The changes 3 and 4 could be interverted, and change 5 could have happened at any time before stage 6.

1. Loss of final –l and –ŋ with compensatory lengthening of the preceding vowel: Vl, Vŋ > Vː. At the same time, *ap > *at (perhaps also *ep > *et).

	Ø	b	d	g	m	n	ŋ	r	l	s
a		at					aː		aː	
e							eː		eː	
i							iː		iː	
o							oː		oː	
u							uː		uː	

2. Fronting of vowels before dental finals (not including –r). 2 must occur after 1, as rule 1a bleeds 2 (otherwise –al would become –eː) and 1b feeds 2 (otherwise –ab and –ad would not merge).

	Ø	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt			ɛn	aː		aː	ɛs
e							eː		eː	
i							iː		iː	
o			et			en	oː		oː	es
u			it			in	uː		uː	is

3. Loss of final nasals and nasalization of the preceding vowels. 3 must occur after 2, as the contrast between –n and –m is lost, and after 1, otherwise final –ŋ would have caused nasalization of the vowel.

	Ø	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ãː	ɛ̃ː	aː		aː	ɛs
e					ẽː	ẽː	eː		eː	
i					ĩː	ĩː	iː		iː	
o			et		õː	ẽː	oː		oː	es
u			it		ũː	ĩː	uː		uː	is

4. Loss of –s and vowel lengthening. The original eː (from –eŋ and –el) merges with –ɛs rather than with –es. 4 must occur after 2, otherwise –as, –us and –os would not have become front vowels. It could however have occurred before 3.

	Ø	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ãː	ɛ̃ː	aː		aː	ɛː
e					ẽː	ẽː	ɛː		ɛː	eː
i					ĩː	ĩː	iː		iː	iː
o			et		õː	ẽː	oː		oː	eː
u			it		ũː	ĩː	uː		uː	iː

5. Labialization of *ip to *up and backing of *-ek to *-ak. This change could have occurred any time before 6.

	Ø	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ãː	ɛ̃ː	aː		aː	ɛː
e				ak	ẽː	ẽː	ɛː		ɛː	eː
i		up			ĩː	ĩː	iː		iː	iː
o			et		õː	ẽː	oː		oː	eː
u			it		ũː	ĩː	uː		uː	iː

6. Final stops shift to glottal stops. Change 6 must occur after 5 and after 2, but could have preceded 3 and 4.

	Ø	b	d	g	m	n	ŋ	r	l	s
a		ɛʔ	ɛʔ	aʔ	ãː	ɛ̃ː	aː		aː	ɛː
e		eʔ	eʔ	aʔ	ẽː	ẽː	ɛː		ɛː	eː
i		uʔ	iʔ	iʔ	ĩː	ĩː	iː		iː	iː
o		oʔ	eʔ	oʔ	õː	ẽː	oː		oː	eː
u		uʔ	iʔ	uʔ	ũː	ĩː	uː		uː	iː

7. At that stage, there was been a contrast between three series of vowels, plain, long and glottalized. Plain vowels (in open syllables and before –r) become lax. This causes the merger of *i and *u to *ə. The phonemes /a/, /e/ and /o/ are centralized and realized as [æ], [ɛ], [ɔ] in open syllable. This change must have occurred after stage 6, although could be possible to reformulate it in such a way that it occurred before stage

6 but after the creation of a series of long vowels (changes 1 and 4).

	Ø	b	d	g	m	n	ŋ	r	l	s
a	[æ]	ɛʔ	ɛʔ	aʔ	ãː	ɛ̃ː	aː		aː	ɛː
e	[ɛ]	eʔ	eʔ	aʔ	ẽː	ẽː	ɛː		ɛː	eː
i	ə	uʔ	iʔ	iʔ	ĩː	ĩː	iː	ər	iː	iː
o	[ɔ]	oʔ	eʔ	oʔ	õː	ẽː	oː		oː	eː
u	ə	uʔ	iʔ	uʔ	ũː	ĩː	uː	ər	uː	iː

At stage 7, *aʔ preceded by *n– becomes nasalized as*ãʔ. This is the only rhyme that is both nasalized and glottalized.

8. Two major vowel shifts occur everywhere except in lax (open) syllables and before –r. First, the front vowel e > ɪ and ɛ > e. Second, the back vowels u > ʉ and o > u.

Additionally, ũ merges with õ and ɛ̃ with ẽ; these last changes could have occurred any time after 3.

	Ø	b	d	g	m	n	ŋ	r	l	s
a	[æ]	eʔ	eʔ	aʔ	ãː	ẽː	aː		aː	eː
e	[ɛ]	ɪʔ	ɪʔ	aʔ	ẽː	ẽː	eː		eː	ɪː
i	ə	ʉʔ	iʔ	iʔ	ĩː	ĩː	iː	ər	iː	iː
o	[ɔ]	uʔ	ɪʔ	uʔ	õː	ẽː	uː		uː	ɪː
u	ə	ʉʔ	iʔ	ʉʔ	õː	ĩː	ʉː	ər	ʉː	iː

With the loss of the glottal stop, the distinction between [æ], [ɛ], [ɔ] and [a], [e], [o] becomes phonemic, and three more vowel phonemes are created.

This scenario yields the attested system of Cone after the loss of the final glottal stop. According to this model, –ɪ, –u and –eː should be the real reflexes of –eb, –ob and –el respectively.

Here are the attested origins of each Cone vowel:

	Inherited	Borrowed / Non-standard form	Dative
i	id, ud, ig	il, ab, ug, ub, ib, el	
ɪ	(eb), ed	ad	
e	ab, (eb), ad	ed, od, el	ar, er
ɛ	e	in, an	
æ	a		
ʉ	ib, ub, ug	ud, id	
ə	i, u		
u	og	ud	
o			ur, ir, or
ɔ	o	od	
ɑ	ag, eg	ab	
iː	ing, il, (el), is, us, eɦu	e, es	
ɪː	es, os	e	
eː	eng, as, e.ba, i.ba	al	
ʉː	ung, ul		

uː	ong, ol, e.bo	on, o.ba
oː	o.ba, u.ba	ol
ɑː	ang, al, a.ba	
ã	ag (in –nag-)	
ĩː	in, un, im	am
ẽː	an, en, on, em	
ãː	am	ang, eng
õː	om, um, i.mo, o.mo	ong, on
	o (followed by nasal suffix)	
ær	ar	al, er
er	er	el
or	or	
ər	ir, ur	

In this table, we have not included conjunct forms or correspondences only attested in the first syllable of a dissyllable. The regular dative forms corresponding to OT vowel+r have distinct correspondences, which will be presented in section 4.

3.5.2 Onsets

The origins of Cone consonants are the following word-initially (not including the correspondences in intervocalic position):

Cone	Inherited vocabulary	Borrowed / irregular
p¹	(C)Cp	spr
p²	b	ɦb
pʰ	(ɦ)ph	
b²	(C)Cb	
mb²	ɦb	**b**
t¹	(C)Ct	
t²	d	
tʰ	(N)th	
d²	(C)Cd	
nd²	Nd	
ts¹	(C)Cts, (b)sl	gc
tsʰ	(N)tsh	
dz²	(C)Cdz, (b)zl	**bts**
ndz²	Ndz	
tɕ¹	(C)Cc	**bkr**, (C)Cky, dpy
tɕ²	j, gr	
tɕʰ	(N)ch, (N)khr, (N)khy	phy
dʑ²	(C)Cj, (C)Cgy	
ndʑ²	Nj, Ngr, Ngy, ɦby	
tʂ²	dr, br	gr, spr
tʂʰ	(ɦ)phr	(N)khr
dʐ²		Cbr, Cgr
ndʐ²	ɦbr, Ndr	ɦgr

k¹	(C)Ck	
k²	g	
kʰ	(N)kh	
g²	(C)Cg	
ŋg²	Ng	**rg**
m¹	Cm	
m²	m	
n¹	Cn	
n²	n	
ɲ¹	Cny, Cm(y)e, Cm(y)i	
ɲ²	ny	n, ng / _as (perhaps inherited)
ŋ¹	Cng	
ŋ²	ng	
s¹	Cs	sl, sr
s²	z	
sʰ	s	sl
z²	Cz	
ɕ¹	(C)Ckr, (C)Ckry, Cpy,	Csh
ɕ²	by	Czh, spy
ɕʰ	(ɦ)phy	sh
ʑ²	sby	by, Czh
ʂ¹	sr, spr	Csh
ʂ²		Czh
ʂʰ	hr	s(Vr)
ʐ¹	sbr, sgr	
x¹	Csh	dp
x²	zh	
xʰ	sh	Csh
ɣ²	Czh	sby
r²	r	
l¹	bl, kl, gl, rl	sl
l	l	
ɬ	lh	
j¹	g.y, dby	
j²	y	ɦ
w¹	?	
w²	w	sbr, rb
h	h	ph, lh

We observe a lot of gaps in the distribution of initials with regards to the tones. Many consonants only appear in the low tone (all voiced obstruents as well as tʂ) and some never occur in the low tone (ts). The initial w– in the high tone is only attested in the word wær¹ ‘scold’, the etymology of which is unclear.

The changes in the initial are much less intricate that those of the vowel, but still involve several series of chain shifts, especially involving the fricatives.

A. The general transphonologization of voicing contrast to a tonal contrast occurs; non-prefixed fricatives become aspirated. All preinitials turn to *h– or *ɦ-, except spr– and sbr– which change to *sr and *zr.

OT dentals	OT alveolo-palatal	OT stop+y/r clusters	other
*s > *sʰ	*ɕ > *ɕʰ		*spr > *sr
*Cs > *hs¹	*Cɕ > *hɕ¹	*Ck > *hk, *Cp > hp	
*z > *s²	*ʑ > *ɕ²	*g > *k², *b > p²	
*Cz > *ɦz²	*Cʑ > *ɦʑ²	*Cg > *ɦg², *Cb > *ɦb²	*sbr > zr

B. Alveolo-palatal fricatives become retroflex fricatives; the gap is filled by various clusters.

OT dentals	OT alveolo-palatal	OT stop+y/r clusters
*sʰ	*ɕʰ > *ʂʰ	*(m)pʰj > ɕʰ
*hs¹	*hɕ¹ > *hʂ¹	*hkr¹, *hkj¹, *hpj¹ > *hɕ¹
*s²	*ɕ² > ʂ²	*pj² > *ɕ²
*ɦz²	*ɦʑ² > ɦʐ²	*ɦbj² > *ɦʑ²

C. Loss of the preinitials

OT dentals	OT alveolo-palatal	OT stop+y/r clusters
*sʰ	*ʂʰ	*ɕʰ
*s¹	*ʂ¹	*ɕ
*s²	*ʂ²	*ɕ²
*z²	*ʐ²	*ʑ²

D. Retroflex fricatives (from OT alveolo-palatals) become velar fricatives, and the gap is filled by various onsets.

OT dentals	OT alveolo-palatal	OT stop+y/r clusters	other
sʰ	*ʂʰ > xʰ	ɕʰ	*r̥ > ʂʰ
s¹	*ʂ¹ > x¹	ɕ¹	*sr > ʂ¹
s²	*ʂ² > x²	ɕ²	
z²	*ʐ² > ɣ²	ʑ²	*zr > ʐ

This evolution in four steps accounts for the origin of the four series of fricatives in Cone. Change B must have occurred before D, but A and C could be placed in a different order without affecting the outcome of these phonetic laws.

3.6 Cone dialects

Previous to our work, three sources of data were available on Cone: Qu (1962),Yang (1996) and Rnamrgyal (2008). The purpose of this section is to compare their data with Nyinpa Cone based our insight about historical phonology.

3.6.1 Qu Aitang

Qu's data were collected from an informant from Lcang-tshal (柳林 Liulin), the seat of the government of Cone county. The main purpose of that paper was to explain the origin of tones in that variety of Cone, and the data provided in his short article is rather limited (only 138 words), insufficient to reconstruction the evolution of the vowel and consonant system from OT to the Lcang-tshal dialect.

Here are the correspondences for the vowels as we can recover them (Qu's transcription has been slightly adapted):

	Ø	b	d	g	m	n	ŋ	r	l	s
a	a, ə		ə	a, ə	oː	aːn, eː	aː, oː, aːŋ	əː, eː, ə	eː, iː, aː	əː, eː
e	e		e			eːn			i	eː
i	i, ə					əːn	əː			iː
o	o, u, e			o		oːn, aːn	uː, oː, oːŋ	oː		eː, iː
u	u	o, u		u		iːn	uː, oːŋ	ə	u, i, uː	uː

The differences with Nyinpa Cone are extensive (in the hypothesis that Qu's transcription are reliable):

a) OT –u did not centralize and merge with –i (stage 7)
b) The chain shift o > u, u > ʉ (stage 8) did not occur.
c) -r was long in most words (though Qu mentions some final –r are preserved in the literary layer)
d) The plain vowels tend to merge with ancient checked syllables (–a and –ag merge as a/ə, –o and –og as –o, –u, –ub and –ug as –u) unlike Cone where they remain quite different.
e) The vowel a, o and u of OT fail to become front vowels in many syllables with final dental –n, –s. It is unclear whether this reflect borrowing from other dialects are whether our stage 2 did not occur in some instances in Liulin Cone.

OT rhymes –Vng generally become long vowels in Lcangtshal as in Nyinpa Cone as in 'tree' <sdong>, Nyinpa duː², Lcangtshal duː². However, exceptions are more common. For instance, 'go.IMP' <song> is sʰuː² in Nyinpa and soːŋ² in Qu's data. Preservation of nasality in these words must reflect a borrowed layer.

Qu's –Vŋ probably stand for nasal vowels, otherwise transcriptions such as dʑuaːŋ¹ 'intestine' <rgyu.ma> corresponding to Nyinpa dʑəˀwãː¹ would be difficult to interpret if Lcang-tshal has preserved the OT final –ŋ.

For initial consonants, the main differences are the following :

f) OT prenasalized voiced stops always lose the prenasalization in Lcang-tshal Cone, for instance <ɦbu> 'worm' becomes buˀ (Nyinpa mbəˀ).
g) OT alveolo-palatal affricates and fricatives becomes retroflex in Lcang-tshal, while k+y cluster become alveolo-palatal. For instance, <gzhu> 'bow' yields Lcang-tshal ʐuˀ (Nyinpa ndæˀɣə¹ <mda.gzhu>).
h) Non-prefixed fricatives do not become aspirated. OT <so> 'tooth' becomes

Lcangtshal so¹ (Nyinpa sʰɔ¹).

In other words, the separation of Nyinpa and Lcangtshal occured before the changes A-D described in 3.5.2.

3.6.2 Yang Shihong

Yang (1996) includes more than 2000 words from six varieties of Tibetan, arranged by the Tibetan etymon. One of which is Cone. The Cone data in was collected from an informant from Gtsang.pa.ba (藏巴哇 Zangbawa).

The data is much more extensive than in Qu's short article, but non-phonemicized; the same word is sometimes transcribed in two different ways in two places. For instance, Tibetan <phabs> 'yeast' appear as tʂʰa³⁵pʰie⁵³ 'yeast to make wine' <chang.phabs> but as pʰei³⁵ 'yeast' <phabs>.

For the rhymes, the correspondences are the following:

	0	b	d	g	m	n	ŋ	r	l	s
a	a/ə	ie, ɛi, ei, e	i,ei, ɛ, ə	a	ou, un, oŋ	e, ɛ	a, oŋ	a, ei, ɛ, ə	ei, ie	ei, ɛ, e, a
e	e, i, ei, i	i	i, e	a	i, ei, ən	ən	i	i, ei, a	i, ei	ie, i
i	i	u	i	i, (ai)	ən, i, in	i	i, ən	i	i	i
o	o, ou, ʊ	o, e	i	u, ou, ʊ	un, oŋ, u	i, un, ou, ən	u, ʊ, o	ʊ, o, i, ʉ	u, ou, ʊ, ɨ, o	i, ou
u	ʊ, u, ou	o, u, i	i	ʊ, u	un	i, u	u, un	u, ən	i, ən, u	u

Yang's transcription deserves some comment : final –n and –ŋ probably represent nasalization, the apparent a/ə split for rhymes in –a is likely to represent an attempt at transcribing a vowel like [ɐ] or [æ].

Given the uncertainty with the transcription, it is difficult to compare it fruitfully to our Cone data. The following differences are however obvious:

a) OT –i and –u (as in Qu's dialect) do not centralize (stage 7)
b) OT –r is not preserved.
c) Rhymes with final –n seem to lose nasality in most cases.
d) In a few examples, rhymes with final –s are not fronted.
e) –al corresponds to a front vowel in all examples.

Nevertheless, we find an important similarity with Nyinpa Cone: –ib, –ub and –ug all correspond to the vowel –u (labialisation of –ib, stage 5).

As for the consonants, the transcription of the voicing and aspiration contrasts does not seem to be reliable. Words with OT /s+unvoiced stop/ groups are transcibed with voiced initials in some words, for instance 'thread' <skud.pa> appears as gi⁵⁵pə⁵³. The outcome of OT voiced fricatives without preinitial are transcribed in some words as aspirated fricatives, such as 'mother's brother' <a.zhang> which appears as Aʰ³⁵ʂʰa³¹. It is extremely unlikely that these peculiarities reflect genuine local pronunciations, and it seems more probable that these are inconsistencies.

The dialect investigated by Yang presents however genuine differences with Nyinpa regarding the consonants: as with the Lcang-tshal dialect, the OT alveolo-palatals generally correspond to retroflex fricatives and affricates, except in 'deer' <sha.ba> where we find x^ha^{35}, a form identical to Nyinpa Cone. The clusters gzh- and bzh- correspond to r- in Yang's transcription, as in 'four' <bzhi> ri^{35}.

The clusters spr- and sbr- correspond to the affricates tʂ- and dʐ-as in 'cloud' <sprin> $tʂi^{53}$, compare Nyinpa $ʂĩː^1$. It is interesting to note that the word 'thick', classical <sbom>, appears as $dʐun^{35}$ in this dialect[12], which suggests a proto-Cone *sbrom like Nyinpa Cone $ʐõː^1$.

A few other irregularities similar to Nyinpa Cone include 'Xanthoxylum' <g.yer.ma> $ʑa^{35}mə^{53}$ with an open vowel (Nyinpa $jær^1mæ^1$ instead of expected *jer^1 $mæ^1$) and 'open' <ɦbyed> $ɕin^{35}$ with irregular nasality is reminicent of Nyinpa forms $ndʑer^2/ɕ^her^1$ 'open' with irregular final –r.

3.6.3 Rnamrgyal Tshebstan

Rnamrgyal (2008)'s work is a general overview of Cone, which focuses on the Bya.rgod.tshang and Gtsang.ba.pa varieties, though some data on the Nyinpa dialect are also given. Tones are not systematically given in Rnamrgyal's work, and we will neglect them here.

Bya.rgod.tshang, the main variety described in Rnamrgyal's work, has the following correspondences with Old Tibetan:

	Ø	b	d	g	m	n	ŋ	r	l	s
a	a, aʔ	ei	ɛ, əi	aʔ, a, ak, aː	aŋ	an, ɛ	a, aː, aŋ, in	ar	ɛ, e, ei	ei, æ
e	e, ei	e, ei	ei, ɛ	aʔ	en, æ	en	en	i, er		əi, ei
i	ə			i, əu, ə	oŋ	in	i, in	i, ar	i	i, ei
o	o		əi	o, əu, ok	oŋ	on, oŋ, an, ɛ	əu	or	o	əi, in
u	ə	ə, əu	əu	əu, u, ək	oŋ	in, ən	əu, oŋ, i, əŋ	ər	əu	ə

Although the vowel do not seem to be always transcribed in a systematic way, this table of correspondences show that the Byargod dialect, though spoken in Lcang-tshal, considerably differs from the dialect studied by Qu Aitang, and seems closer to the Nyinpa dialect studied in the present paper. If we apply the following correspondences:

Rnamrgyal's transcription	Our transcription
ei	e
e	ɛ
o	ɔ
əi	ɪ

[12] The entry is labelled with the erroneous written Tibetan form *smom, probably a typo.

əu	ʉ
Vŋ	Ṽ

we obtain a system almost identical to that of the Nyinpa dialect, except for the fact that OT –u and –i do no become centralized. Unlike the two previous dialects, final –r is well-preserved in Bya.rgod.tshang. However, the definite proof that these dialects are quite close is the fact that they share irregular correspondences for specific lexical items:

Meaning	Old Tibetan	Nyin-pa	Bya-rgod-tshang	Irregularity
thread	skud.pa	kʉː¹wæ¹	kəu wa	-ud
thick	sbom.po	ʐõː¹	roŋ mbo	sbr-
milk	ɦo.ma	õː¹wãː¹	ɦoŋ waŋ	-o
you (ABS, GEN)	khyod, khyod-kyi	tɕʰɔ¹ tɕʰʉ¹	tɕʰo tɕʰəu	-od, -od.kyi

Rnamrgyal (2008) also provides some data from Nyinpa, and the rhyme correspondences are quite similar to those of Bya.rgod.tshang:

	Ø	b	d	g	m	n	ŋ	r	l	s
a	a	ei	ei	a		an	aŋ, in	ar		
e			əi							
i				i			i			
o	o		i, əi	əu				or		
u							əu	ər		

In Rnamrgyal's data, the main difference between Nyinpa and Bya-rgod-tshang seems to be the initial consonants, in particular the treatment of alveolo-palatals: Nyinpa has velar fricatives while Bya-rgod-tshang has retroflex ones. For instance, the initial zh- corresponds to ʂ- in Bya-rgod-tshang and x- in Nyinpa; <zhing> 'field' is *ʂin* in Bya-rgod and *xin*^{13} in Nyinpa according to Rnamrgyal. Compare with tɕʰə²xĩː² <chu.zhing> in our data.

The Gtsang.ba.pa dialect is somewhat more divergent from Nyinpa. In particular, it lost the final –r and does not share the fronting of –ab (unlike in the Gtsang.ba.pa data from Yang):

	Ø	b	d	g	m	n	ŋ	r	l	s
a	a	ə	ei	a,	uŋ	ɛ	aː, in, aŋ, oŋ	a		ei
e	ei, i	ə		a						
i	ə			ə, u		ən	i, ə	e		i, ə
o	o, əu	o		əu	əŋ	on, i	əu, oŋ			əi
u	u, ə	u	i	u	oŋ	ən	u, o	u	u	

The initial consonants also present distinct similar developments for some clusters, and we do not find the irregularities shared between Nyinpa and Bya-rgod-tshang:

Meaning	Old Tibetan	Nyin-pa	Bya-rgod-tshang	Gtsang.ba.pa
snake	sbrul	ʐʉː¹	rəu	dʐu
cloud	sprin	ʂĩː¹	ʂʰin	tʂən
thread	skud.pa	kʉː¹wæ¹	kəu wa	ki pa

3.6.4 Concluding remarks

Given the limited evidence from other sources, it is premature to attempt at a dialectological survey of Cone, but the available data seem to indicate that at least two quite distinct Tibetan dialects are spoken in Cone county. It is not even clear whether all dialectal varieties in Cone present any exclusive common innovation that would allow to classify them together.

4. Morphology

As in most Sino-Tibetan languages, verbal morphology is by far more complex than nominal morphology in Cone. Both involve complex vowel alternations, which are not always historically explainable.

4.1 Nominal morphology

As other Tibetan languages, Cone has a system of case marking. Cone case is marked by a combination of suffixes, vowel and consonant alternations. Although the system in itself is fairly regular, the alternations are quite opaque synchronically. The case suffixes, unlike lexical morphemes, are always realized low. When the (monosyllabic) noun has a high tone, the suffix is low: the high tone cannot spread onto it. When the noun has a low tone, the suffix is realized extra-low, lower than the tone of the noun stem. These syllables are marked in our transcription by a grave accent suffix V̀ on the vowel.

In this section, we will study four cases, which illustrate all the attested alternations: Genitive (ɦbrel.sgra, in Old Tibetan *–gi*, *–gyi*, *–kyi, –yi* or *–ɦi* depending on the context), Ergative (byed.sgra, OT *–gis*, *–gyis*, *–kyis* or *–s*), Dative (la.don, OT *–la*, *–r*) and Comitative (OT *dang*). The latter one is not recognized as a case in its own right in traditional Tibetan grammar, various authors have recently argued that it should be analyzed this way (Hill 2004, Tournadre 2010).

4.1.1 Plain vowel stems

Plain vowel stem are the ones that correspond to Old Tibetan open syllables. This includes the nouns ending in –æ, –ɛ, –ɔ and –ə, the four short vowels which have no long counterpart.

The following examples illustrate case formation of various nouns:

meaning	OT	Absolutive	Genitive	Ergative	Dative	Comitative
horse	rta	tæ¹	te¹	teː¹	te¹	tæ¹ræ̀
goat	ra	ræ²	re²	reː²	re²	ræ²ræ̀
parrot	ne.tso	nɛ²tsɔ¹	nɛ²tsu¹	nɛ²tsɪː¹	nɛ²tso¹	nɛ²tsɔ¹ræ̀
demon	ɦdre	ndzɻɛ²	ndzɻɪ²	ndzɻɪː²	ndzɻe²	ndzɻɛ²ræ̀
fire	*Cmye	ɲɛ¹	ɲɪ¹	ɲɪː¹	ɲe¹	ɲɛ¹ræ̀
bug	ɦbu	mbə²	mbʉ²	mbiː²	mbo²	mbə²ræ̀
man	*Cmyi	ɲə¹	ɲʉ¹	ɲiː¹	ɲo¹	ɲə¹ræ̀

These alternations are fairly regular. The comitative is always formed by adding a suffix –ræ̀, and the three other case present the following series of vowel alternation:

Absolutive	Genitive	Ergative	Dative
-æ	-e	-eː	-e
-ɔ	-u	-ɪː	-o
-ɛ	-ɪ	-ɪː	-e
-ə	-ʉ	-iː	-o

Note that the short /o/ only occurs in Cone in the dative form of –ɔ and –ə stem nouns.

The forms of the ergative are clearly inherited from OT, where this case is marked by a suffix –s in open syllable stems. The ergative undergoes the regular changes:

Cone absolutive	OT absolutive	Cone ergative	OT ergative
æ	a	eː	as
ɛ	e	ɪː	es
ɔ	o	ɪː	os
ə	i	iː	is
ə	u	iː	us

The forms of the dative and of the genitive, however, cannot be explained as retention from OT. The vowels involved have the following regular origins:

Cone absolutive	OT absolutive	Cone Genitive	Possible OT origins for the genitive forms
æ	a	e	**ab**, ad
ɛ	e	ɪ	(**eb**), ed
ɔ	o	u	og, (**ob**?)
ə	i	ʉ	**ib**, ub, ug
ə	u	ʉ	ib, **ub**, ug

We have therefore two possible scenarios to explain the origin of the Cone Genitive. First, we could reconstruct a Genitive suffix *-b: this would yield exactly the expected forms for all the stems. The drawback of this hypothesis is that no genitive *-b is found anywhere in other Tibetan languages.

An alternative possibility would be to reconstruct a suffix *-g (a reduced form of OT *gi*, *gyi*, *kyi*). However, this solution yields the correct forms only for –ɔ and –ə stems, and one has to suppose analogical levelling in favour of –ʉ in the genitive of –ə stems, as *-i, not –ʉ would be expected for the Cone genitive of Old Tibetan –i stems (-ig > –i). In this hypothesis, the genitive of OT –a and –e stems must have a different origin (either a *-b or a *-d suffix).

The first hypothesis seems more likely in view of Cone historical phonology, even if the OT origin of the suffix *-b remains unclear.

The dative forms in Cone are not inherited from those of OT, as open syllable nouns form their genitive by the addition of a –r suffix, which ought to be preserved in Cone. The reconstruction of the dative form is difficult in that the vowel /o/ is not found in the normal vocabulary and its origin is unknown. A special phonological

process, involving either vowel fusion, vowel harmony, should be supposed. We propose that the dative was derived from the genitive forms at stages 6 or 7 of the evolution of Cone vowels (see section 3.5.1). The following table presents the relevant data, including our reconstruction of the rhymes of the genitive and dative forms of Cone plain vowel stems:

Cone absolutive	OT absolutive	Cone Genitive	Cone Genitive (stage 6/7)	Cone Dative (stage 6/7)	Cone Dative
æ	a	e	*ɛʔ	*ɛʔ	e
ɛ	e	ɪ	*eʔ	*ɛʔ	e
ɔ	o	u	*oʔ	*ɔʔ	o
ə	i	ʉ	*uʔ	*ɔʔ	o
ə	u	ʉ	*uʔ	*ɔʔ	o

Although modern Cone /o/ has no clear origin in Old Tibetan, at stages 6/7, one could reconstruct it back as *ɔʔ, a rhyme that was not included in our reconstruction model. Since at stage 8 all *ɛʔ > *eʔ, *eʔ > *ɪʔ, *oʔ > *uʔ and *uʔ > *ʉʔ, it is logical to suppose also that *ɔʔ is raised to *oʔ, with subsequent loss of glottal stop.

The dative form for short vowel, long vowel and nasal stems is marked by a suffix –e, as we will see in the following section. This suffix –e would have been *ɛʔ at stages 6 / 7. We propose that the dative forms were created out of the genitive ones at stage 6 or 7 by addition of this suffix *-ɛʔ and subsequent vowel harmony: all vowels shifted to their corresponding mid-low counterpart. This had no influence on the genitive form *ɛʔ of ancient –a stems, which was already a mid-low vowel at that stage, but all other vowels shifted, and then underwent the regular changes at stage 8.

Other equally logical explanations could doubtlessly be proposed to account for the Cone dative, but the fact that the vowels are short militates against a hypothesis in terms of vowel fusion, which always give long vowels.

We found only two irregular forms with plain vowel stem. First, some nouns with the suffix –wæ such as kʰæ²wæ¹ ‘house’ (from <khang.ba> with irregular vocalism) or tsʰə²wæ¹ ‘household’ have a genitive form in –u: kʰæ²wu¹, tsʰə²wu¹ instead of expected *kʰæ²we¹, *tsʰə²we¹. The ergative and dative are regular (kʰæ²weː¹, kʰæ²we¹ respectively). Second, the first and second person singular pronouns, whose paradigms are presented in the following table:

OT	Absolutive	Genitive	Ergative	Dative
nga	ŋæ²	ŋə²	ŋeː	ŋãː²
khyod	tɕʰɔ¹	tɕʰʉ¹	tɕʰɪː²	tɕʰo¹

Only the ergative is regular, genitive and dative have idiosyncratic forms that cannot be explained by known OT morphology. For the second person, even the absolutive must derive from a non-standard form such as *khyo.

4.1.2 Short vowel stems.

The short vowel stems correspond to OT rhymes ending in stops. This includes stems ending with the vowels ɑ e i ɪ u ʉ, that all have long counterparts.

The attested alternations are illustrated by the following examples. Despites the fact that most of the vowels have several OT origins, the oblique case forms are always predictable from the absolutive: the contrasts from OT have been neutralized.

meaning	OT	Absolutive	Genitive/ Ergative	Dative	Comitative
tiger	stag	tɑ¹	tæ¹qqə̀	tæ¹ʁè	tæ¹χtæ̀
needle	khab	kʰe¹	kʰɛ²kkə̀	kʰɛ²ɣè	kʰɛ²ttæ̀
Tibetan	bod	pɪ²	pɛ²kkə̀	pɛ²ɣè	pɛ²ttæ̀
louse	shig	xʰi¹	xʰə²kkə̀	xʰə²ɣè	xʰə²ttæ̀
people	dmangs.tshogs	mã:²tsʰu¹	mã:²tsʰɔ¹qqə̀	mã:²tsʰɔ¹ʁè	mã:²tsʰɔ¹χtæ̀
sheep	lug	lʉ²	lə²kkə̀	lə²ɣè	lə²ttæ̀

These alternations can be analyzed as follows:

Absolutive	Genitive/ Ergative	underlying form	Dative	underlying form	Comitative	underlying form
ɑ	æqqə	/æk.Gə/	æʁe	/æk.ə/	æχtæ	/æk.Dæ/
e	ɛkkə̀	/ɛC.Gə/	ɛɣe	/ɛC.e/	ɛttæ	/ɛC.Dæ/
ɪ	ɛkkə̀	/ɛC.Gə/	ɛɣe	/ɛC.e/	ɛttæ	/ɛC.Dæ/
i	əkkə̀	/əC.Gə/	əɣe	/əC.e/	əttæ	/əC.Dæ/
u	ɔqqə	/ɔk.Gə/	ɔʁe	/ɔk.e/	ɔχtæ	/ɔk.Dæ/
ʉ	əkkə	/əC.Gə/	əɣe	/əC.e/	əttæ	/əC.Dæ/

In all oblique cases, the regular conjunct form of the short vowels emerge. The surface [ʁ] and [ɣ] found in dative forms are the realizations of final /–k/ and /–C/ followed by a vowel (see in 3.5.1). /D/ and /G/ represent morpho-phonemes that are realized variously as unvoiced stops, voiced stops or spirants [ɣ] / [r] depending on the preceding syllable. After /-k/, /-C/ and /-r/, they are realized as unvoiced stops.

There is one stem in –ə whose declension belongs to the short vowel type rather than to the plain vowel type: the determiner /zə²/ ‘a’, whose genitive/ergative is /zə²kkə̀/ and dative /zə²ɣè/. This determiner is probably related to OT <zhig>, though the expected regular form would have been *xi².

The declension of stems in final –r in Cone is a variant of short vowel stem declension:

meaning	OT	Absolutive	Genitive/ Ergative	Dative	Comitative
ice	dar	tær²	tær²kə̀	tæ²rè	tær²tæ̀
gser	gser	ser¹	ser¹kə̀	se¹rè	ser¹tæ̀

/G/ and /D/ are realized as voiceless stops after final –r.

4.1.3 Nasal vowel stems.

Cone nasal vowel stems come from OT rhymes ending in –m and –n and in some cases in –ng (in borrowings from other Tibetan languages).

The following examples illustrate the regular declension of the nouns in nasal vowel stems; as short vowel stems, they do not distinguish between genitive and

ergative.

meaning	OT	Absolutive	Genitive/ Ergative	Dative	Comitative
otter	sram	ʂãː¹	ʂæ¹ŋgə̀	ʂæ¹nè	ʂæ¹ndæ̀
bear	dom	tõː²	tɔ²ŋgə̀	tɔ²nè	tɔ²ndæ̀
teacher	dge.rgan	geː²gẽː²	geː²gɛ²ŋgə̀	geː²gɛ²nè	geː²gɛ²ndæ̀
tree	shing	xʰĩː²	xʰə²ŋgə̀	xʰə²nè	xʰə²ndæ̀

The principle here is identical with short vowel stems: the suffixes /-Gə/, /-e/ and /-Dæ/ respectively are added to the conjunct form of the noun stem:

Absolutive	Genitive/ Ergative	underlying form	Dative	underlying form	Comitative	underlying form
ãː	æŋgə	/æN.Gə/	æne	/æN.e/	ændæ	/æN.Dæ/
õː	ɔŋgə	/ɔN.Gə/	ɔne	/ɔN.e/	ɔndæ	/ɔN.Dæ/
ẽː	ɛŋgə	/ɛN.Gə/	ɛne	/ɛN.e/	ɛndæ	/ɛN.Dæ/
ĩː	əŋgə	/əN.Gə/	əne	/əN.e/	əndæ	/əN.Dæ/

The morphophoneme /N/ is realized [n] in intervocalic position, while /D/ and /G/ merge with /N/ as voiced prenasalized stops [nd] and [ŋg].

The short nasal vowel nouns nã¹ ‘pus’ <rnag> and nã² ‘forest’ <nags> are not treated as nasal stems, their oblique forms follow the declension of a –ɑ short vowel stem.

The noun nãː² ‘inside’ <nang> has no conjunct form, and its oblique forms are similar to a long vowel stem nãː²ɣə, nãː²ŋe, nãː²ræ̀. This strongly supports the idea that nasalization is secondary in this noun; it is an inherited form whose regular reflex should have been *nɑː² but became nasalized because of a nasal suffix, or possibly due to spread of nasality from the initial.

4.1.4 Long vowel stems.

As plain vowel stems, long vowel stems have no conjunct forms. These stems come from syllables with final –ng, –l and –s in OT.

The regular declension patterns for these nouns is quite straightforward:

meaning	OT	Absolutive	Genitive/ Ergative	Dative	Comitative
deer	sha.ba	xʰɑː²	xʰɑː²ɣə̀	xʰɑː²ŋè	xʰɑː²ræ̀
rabbit	ri.bong	rə²ɣuː²	rə²ɣuː²ɣə̀	rə²ɣuː²ŋè	rə²ɣuː²ræ̀
monkey	spreɦu	ʂiː¹	ʂiː¹ɣə̀	ʂiː¹ŋè	xʰɑː²ræ̀

The morphophonemes /D/ and /G/ are realized as [r] and [ɣ] between vowel, which is why the suffixes /-Dæ/ and /-Gə/ appear as [ɣə] and [ræ] with long vowel stems.

The suffix /-e/ cannot form a hiatus with the preceding vowel, and an epenthetic /ŋ/ is inserted.

Some nouns in –uː coming from a suffix –bo/-po in OT have alternative ergative and dative forms similar to plain vowel stem. For instance, dʑæ²ruː² ‘king’ <rgyal.po> has two possible dative forms dʑæ²ruː²ŋè or dʑæ²ro²; pɑː¹wuː¹ ‘beggar’ has pɑː¹wɪː¹ in the ergative and pɑː¹wo¹ in the dative. The genitive and comitative forms of these

nouns is regular (pɑː¹wuː¹ɣə̀ and pɑː¹wuː¹ræ̀). This is also true of the plural suffix –tɕʰuː (genitive –tɕʰɪː, dative –tɕʰo), which might be indirectly related to the common <tsho> suffix found in various Tibetan languages.

This section has described the morphophonological alternations found in the Cone case marking system. Similar alternations are also found in the verbal morphology, as we will see.

4.2 Verbal morphology

This section will describe how verbal stem alternations in Cone relate to Old Tibetan ones. As we will see, some of these alternations are inherited, and some are innovated by analogy or sound changes.

In Old Tibetan, verbs had up to four distinct stems, traditionally called *present* (da.lta), past (ɦdas.pa), *future* (ma.ɦong.pa) and *imperative* (skul.tshig). Although these labels are misleading, we will nevertheless keep the traditional terminology, as the focus of this paper is not the functions of these categores in modern Cone.

Like all Tibetan languages, Cone has never more than three verb stems. The Cone present stem corresponds to both OT present and future, while past and imperative correspond to their OT counterpart. The Cone present stem sometimes appear in the conjunct stem, as we will see.

4.2.1 Vowel alternations

Verbs with vowels alternations in Cone can all be considered to be irregular, as most verbs have no alternations, including verbs whose vowel is belong to the vowels of the alternating series. Thirteen categories are attested:

	PR	PS	IMP	nb.	Cone example	OT	meaning
1	æ	eː	ɪː	3	tæ¹, teː¹, tɪː¹	lta, bltas, ltos	see
2	ɔ	ɪː	ɪː	5	kɔ¹, kɪː¹	rko, brkos	dig
3	ɛ	ɪː	ɪː	3	dʑɛ¹, dʑɪː¹	rje, brjes	change
4	ə	iː	iː	13	ɕə¹, ɕiː¹	skyi, bskyis	borrow
5	æ	ɪː	ɔ	1	sæ², sɪː², sɔ²	za, zos, zo	eat
6	ɑ	ɑ	u	7	ndʐɑ², tʂɑ², tʂu²	ɦbreg, bregs	cut, mow
7	u	ɑ	u	3	ndʑu², ɣɑ², ɣu²	ɦjog, bzhag, zhog	put
8	i	eː	iː	1	ɕi², ɕeː², ɕiː²	byed, byas, byos	do
9	ɪ	ɪː	ɪː	1	gɪ², gɪː²	bgod, bgos	share
10	ãː	ãː	õː	3	dãː², dõː²	bsdams, sdoms	tie
11	ãː	ãː	ũː	1	ɲãː², ɲũː²	nyal, nyol	sleep
12	ẽː	ɑː	uː	3	lẽː², lɑː¹, luː¹	len, blangs, longs	pick up
13	ĩː	ʉ̃ː	ʉ̃ː	1	ndzĩː², zʉ̃ː²	ɦdzin, bzung	hold
14	ɑː	ɑː	uː	9	mbɑː², pɑː², puː²	ɦbal, bal	pluck out
15	ær	ær	or	4	ŋgær², kær¹, kor¹	dgar, bkar	chop

These thirteen categories can be further divided into four main categories: plain vowels, short vowels, nasal/long vowels and –r.

Apart from these categories, we find a limited number of verbs that exhibit

suppletion.

4.2.1.1 Plain vowel stems

The plain vowel stem alternations are the most common cases of irregular verbs in Cone. The present tense of these verbs is one of {æ, ɔ, ɛ, ə}, the vowels corresponding to OT open syllables. The alternations observed for these stems result from the addition of an –s suffix in the past and imperative stems, and by the a>o ablaut in the imperative.

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
1	æ	a	eː	as	rː	os
2	ɔ	o	rː	os	rː	os
3	ɛ	e	rː	es	rː	es
4	ə	u, i	iː	us, is	iː	us, is

The Cone alternations here faithfully reflect the OT paradigms. The verb 'to eat' present a unique alternation: PR sæ², PS sɪː², IMP sɔ². These forms exactly reflect OT *za*, *zos*, *zo*, an irregular paradigm, which I argued to be the only trace of verbal agreement in Tibetan (Jacques 2010a). Cone seems to be one of the rare languages to preserve the a/o ablaut in the past stem. Most other Tibetan languages have replaced *zos* by analogical *bzas* as in Lhasa Tibetan.

4.2.1.2 Short vowel stems

Short vowel stems originate from stop final syllables in Old Tibetan. Unlike plain vowel stems, short vowel stems have a distinct conjunct form. It appears when the present stem is suffixed with the present /-Gə/ suffix. The same range of alternations as with genitive/ergative of nouns is observed:

Basic form	Suffixed form	example	etymology	meaning
ɑ	æqqə	tɕɑ¹, tɕæ¹qqə¹	bcag	break
e	ɛkkə	se¹, sɛ¹kkə¹	bsad	kill
ɪ	ɛkkə	tɪ¹, tɛ¹kkə¹	lteb	fold
i	əkkə	tsi¹, tsə¹kkə¹	rtsig	lay bricks
u	ɔqqə	ndʑu², ndʑɔ²qqə¹	ɦjog	put
ʉ	əkkə	gʉ², gə²kkə¹	sgug	wait

However, these regular neo-alternations are unrelated to the OT ablaut.

The final –s suffix found in the past and imperative, which caused most of the alternations in plain vowel stems, left no trace after stops: –Vbs and –Vgs rhymes merge with their –Vb and –Vg counterparts.

The attested alternations are the following; categories 8 and 9 are highly irregular, attested each by only one example.

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
6	ɑ	ag	ɑ	ags	u	ogs
7	u	og(s)	ɑ	ags	u	ogs
8	i	?	eː	as	iː	?
9	ɪ	od	rː	os	rː	os

There only one source of vowel alternation for the types 6 and 7: a/o ablaut in OT. This ablaut takes place regularly in the imperative, and in some verb stems in the present (type 7). We would expect verbs from OT stems in –ab and –ad to present the alternation between –e and –u (reflecting OT ab/obs) and –e and –ɪ (reflecting OT ad/od). Besides, some verbs also had a/e ablaut in the present stem. Since –ag and –eg both become –ɑ in Cone, this distinction is lost for –g final verbs (for instance OT <ɦibreg> 'cut' regularly becomes ndzɻɑ², indistinguishable from a protoform *ɦibrag). For –ab and –ad stem verbs however, we should expect present stems in –ɪ (from –eb) and –i (from –id) alternating with –e (from –ab / –ad). The is one type 6 verb with –e in the past tense instead of -ɑ : the auxiliary dʑɑ² <rgyag>, past dʑe² <rgyab>. This irregular vowel alternation directly reflects an OT final stop alternation.

The expected paradigms of the verbs tse¹ 'cut off' <gtsab>, tɕe¹ 'cut' <bcad> and the a/e ablaut verb 'to fold' tɪ¹ <lteb> should be:

meaning	PR	PS	IMP
cut off	gtsab	btsabs	gtsobs
	tse¹	tse¹	*tsu¹
cut	gcod	bcad	chod
	*tɕɪ¹	tɕe¹	*tɕʰɪ¹
fold	lteb	bltabs	ltobs
	tɪ¹	*te¹	*tu¹

Instead of preserving these alternations, these verbs became invariable in Cone, having generalized either the present or the past stem (the forms that underwent analogy are shaded in grey).

Another origin for alternating short vowel stems is the present tense –d suffix of OT. Only two verbs (ɕi² 'do' <byed> and gɪ² 'share' <bgod>) preserve a trace of this suffix. The verb 'share' straightforwardly reflects OT present <bgod>, past/imperative <bgos> which regularly yield the Cone paradigm gɪ², gɪː².

On the other hand, the verb 'do' presents irregular correspondences with OT. The past ɕeː² can be accounted for with the OT past stem <byas>, but the present ɕi² and imperative ɕiː² are unexplained: <byed> and <byos> should have become *ɕɪ² and *ɕɪː². Since the contrast between /i/ and /ɪ/ is difficult to perceive, this seems to raise the question whether these forms are correctly transcribed. However, the fact that the conjunct of ɕi² is ɕə²kkə¹ can dissipates this doubt: had the present stem been *ɕɪ², its conjunct form should have been *ɕɛ²kkə¹.

To explain these discrepancies, we propose that the present and imperative stems are not the result of irregular development, but that the paradigm of 'do' is suppletive, taking some forms from the OT verb <byed> and other from <bgyid> which also means 'do'. The regular outcome of the present, past and imperative stems of these two verbs are presented in the following table:

	PR	PS	IMP
do 1	byed	byas	byos
	*ɕɪ²	ɕeː²	*ɕɪː²
do 2	bgyid	bgyis	gyis
	*dʑi²	dʑiː²	ɕiː²

The correspondence of OT gy– to Cone ɕ– in the low tone is not attested by any other example, as this initial is quite rare in OT; it is based on the hypothesis that gy– evolves in a way parallel to Cky-. Based on this phonetic law, the imperative ɕiː² can be the regular outcome of the imperative stem <gyis>. The verb 'do' in Cone has its past stem from the verb <byed>, and its imperative stem from <bgyid>.

The present stem ɕi², however, resembles neither the present *ɕɪ² <byed> nor *dʑi² <bgyid>. It points perhaps to an OT form *gyid for the present tense rather than <bgyid>. In this hypothesis, the proto-Cone paradigm of this verb was *{gyid, bgyis, bgyi, gyis}. Given the fact that the present stem <bgyid> is quite irregular in having the b- prefix, proto-Cone *gyid was perhaps an analogical form based on the past form; however, the expected present stem should be *ɦgyid with a nasal prefix. An alternative possibility is that this stem is a blend of the two forms *ɕɪ² and *dʑi², merging the initial of the former with the rhyme of the latter.

4.2.1.3 Nasal and long vowel stems

The nasal stems come from OT rhymes in –m and –n (and –ng in rare cases). Like short vowel stems, they present conjunct forms with the present /-Gə/ suffix, as in the following table:

Basic form	Suffixed form	example	etymology	meaning
ãː	æŋgə	dãː², dæ²ŋgə¹	bsdams	tie
ẽː	ɛŋgə	ndẽː², ndɛ²ŋgə¹	ɦdon	read
õː	ɔŋgə	kʰõː², kʰɔ²ŋgə¹	khom	have free time
ĩː	əŋgə	ɣĩː², ɣə²ŋgə¹	sbyin	give

The verb ɲãː² 'sleep' <nyal> has no special conjunct form, and appears as ɲãː²ɣə¹ with the present suffix. The adjectives mãː² 'many' <mang> and tʂãː² 'straight' <drang> have present forms without nasality mɑː²ɣə¹ and tʂɑː²ɣə¹. In these thre irregular forms, nasality is clearly a secondary feature.

Long vowel stems have no distinct conjunct form with the present suffix, as in kɑː¹ 'fill up' <skang>, present kɑː¹ɣə¹.

Five patterns of vowel alternation are attested with nasal and long vowel stems, including two mixed category with nasal vowel in the present stem and long vowel in the past and imperative:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
10	ãː	am	ãː	ams	õː	oms
11	ãː	al	ãː	al	ũː	ol
12	ẽː	en(d)	ɑː	ang	uː	ongs
13	ĩː	in(d)	ʉː	ung	ʉː	ungs
14	ɑː	ang/al	ɑː	angs/al	uː	ongs/ol

Pattern 11 is a variant of 14 with secondary nasalization, as explained above. Patterns 10 and 14 reflect the a/o ablaut of OT in –m coda and –ng or –l coda stems respectively. Syllable with final codas –n and –s in OT become nasal and long vowels respectively in Cone, but with vowel fronting the paradigm would be:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
	ẽː	an	ẽː	an	ẽː	on

	eː	as	eː	as	ɪː	os

In the case of OT –an stems, give the fact that OT –an and –on merge as –ẽː in Cone, sound change alone makes these verb become invariable. For –as stems, we would expect a -eː / -ɪː alternation between past and imperative, but not example has been found.

The mixed patterns 12 and 13 represent inheritance from OT alternations between –n (more exactly –nd with *da.drag*) with vowel fronting in the present and –ng in the past and imperative. The Cone forms are the direct reflexes of the OT paradigm.

4.2.1.4 -r

Cone preserves the OT coda –r, and a/o ablaut is maintained in some verbs:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
15	ær	ar	ær	ar	or	or

Since the final consonant did not disappear, no complex vowel alternation has been created in these verbs.

4.2.2 Initial consonants

Verbal stem alternation in OT was not limited to vowel ablaut and addition of suffixes. Extensive initial consonant alternation was also observed.

The following patterns are attested in our Cone data:

	PR	PS	IMP	Cone example	OT	meaning
1	mb	p²	p²	mbɑː², pɑː², puː²	fibal, bal, bol	pluck out
2	ndʐ	tʂ²	tʂ²	ndʐə², tʂiː²	fidri, bris	write
3	ŋg	k²	k²	ŋgeˀ², keˀ²	gad	blossom
4	mb	p¹	p¹	mbʉ², pʉ¹	fibigs, phug	drill
5	nd	t¹	t¹	ndu², tɑ¹, tu¹	fidog, btags	hang
6	ndz	ts¹	ts¹	ndzʉ², tsʉ¹	fidzugs, btsugs	insert
7	ndʑ	tɕ¹	tɕ¹	ndʑu², tɕɑ¹, tɕu¹	figyog, bkyags	raise
8	ŋg	k¹	k¹	ŋgeˀ², keˀ¹	figebs, bkab	cover
9	ndz	z	z	ndzĩː², zʉː²	fidzin, bzung	hold
10	ndʑ	ɕʰ	ɕʰ	ndʑerˀ², ɕʰerˀ¹	fibyed, phye	open
11	ndʑ	ɣ	ɣ	ndʑu², ɣɑ² ,ɣuˀ²	fijog, bzhag, zhog	put
12	tʰ	t	t	tʰorˀ¹, torˀ¹	gtor	separate
13	tsʰ	ts	ts	tsʰẽːˀ², tsẽːˀ¹	fitshem, btsems	sew
14	tɕʰ	tɕ	tɕ	tɕʰiˀ¹, tɕiːˀ¹	fikhrud, bkrus	wash

These patterns can be divided into four classes: prenasalized/low tone unvoiced stop alternation, prenasalized/high tone unvoiced stop alternation, prenasalized/fricative alternation and aspirated/unaspirated alternation. All of these patterns have clear OT origins.

4.2.2.1 Prenasalized / unvoiced (low tone)

Cone verbs with prenasalized / voiced alternation originate from two classes of OT verbs: the non-alternating verbs with nasal prefix in the present, and the verbs with voiced/voiceless stop alternation which will be treated in the next section.

The first class simply had a nasal prefix in OT. Since voiced unprefixed stops became voiceless stops in Cone, regular phonetic laws yield the following alternations :

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP (Cone)	(OT)
mb²	ɦb	p²	b	p²	b
nd²	ɦd	t²	d	t²	d
ndʐ²	ɦdr/ɦbr	tʂ²	dr/br	tʂ²	dr/br
ŋg²	ɦg	k²	g	k²	g

Past and imperative stems have low tone like the present stem. The dental stop alternation nd- / t² has not yet been found, but the other three patterns are well attested in Cone.

The ndʐ² / tʂ² alternation has several distinct origins. As in many Tibetan languages, dr- and br- merge as tʂ² in Cone, so that three conjugations merge into one:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP (Cone)	(OT)
br stem	ndʐ²	ɦbr	tʂ²	br	tʂ²	br
dr stem	ndʐ²	ɦdr	tʂ²	dr	tʂ²	dr
r stem	ndʐ²	ɦdr	tʂ²	br	tʂ²	r

r-stem verbs have been discovered by Hill (2005), who pointed out that the real OT paradigm of 'write' was *ɦdri*, *bris*, *bri*, *ris*. Jacques (2010b) showed that a few other verbs presented the same alternations, in particular 'cut' *ɦbreg, bregs* more properly spelled *ɦdreg*. In all known form of Tibetan except OT texts, the present and imperative stems have been remodelled after the b- prefix of the past stem suffix has been reanalyzed as a part of the stem.

Cone is no exception to this trend. Although sound change has deprived us of any way of determining whether the present stem ndʐ- of the verbs 'ask' ndʐə² <ɦdri> and 'cut' ndʐɑ² <ɦdreg> comes from the origin OT form or from a analogized form <ɦbri> / <ɦbreg>, the imperative of those verbs has been remodeled as tʂ² after br-stems, otherwise r² should be found in Cone.

4.2.2.2 Prenasalized / unvoiced (high tone)

A large class of volitive verbs in OT presented an alternation between voiced stops in the present and future stems, and unvoiced in the past and imperative (Coblin 1976). Present forms generally had a/o, a/e or u/i ablaut in the verbs, and a nasal ɦ- prefix. Verbs with a/e and u/i ablaut in the present had either an –s suffix or presented –ng/–n alternation. The past form had the regular b- prefix (but not the –s suffix), and the future the d-/g- prefix. The basic paradigm was the following:

	PR	PS	FT	IMP
cover	ɦgebs	bkab	dgab	khob
take out	ɦdon	bton	gdon	thon
insert	ɦdebs	btab	gdab	thob

The imperative was prefixless. Since unvoiced stops were realized as aspirated when in absolute initial position, the aspiration was originally non-phonemic in this context (see Li 1933, Coblin 1976, Hill 2007), but became subsequently phonologized in all Tibetan languages, including Cone.

The expected Cone paradigms would then be the followings:

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
mb²	ɦb	pʰ	ph	pʰ	ph
nd²	ɦd	t¹	bt	tʰ	th
ndz²	ɦdz	ts¹	bts	tsʰ	tsh
ndʑ²	ɦj	tɕ¹	bc	tɕʰ	ch
ndʑ²	ɦgy	ɕ¹	bky	tɕʰ	khy
ŋg²	ɦg	k¹	bk	kʰ	kh

However, no Cone verb exactly has any of these paradigms. The attested forms are the following:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
4	mb²	ɦb	p¹	ph	p¹	ph
5	nd²	ɦd	t¹	bt	t¹	th
6	ndz²	ɦdz	ts¹	bts	ts¹	tsh
7	ndʑ²	ɦj	tɕ¹	bc	tɕ¹	ch
8	ŋg²	ɦg	k¹	bk	k¹	kh

We always find a non-aspirated in the imperative: the imperative stem has clearly been remodeled after the past stem, even when a/o vowel alternation is preserved. For instance, for the verb ‘attach, hang’, OT past *btags*, imperative *thog*s, we should have in Cone past tɑ¹ (the attested form) and imperative *tʰu¹. Instead, the imperative is tu¹, preserving the a/o alternation but generalizing the unaspirated stop.

For labial stems, the past stem b- prefix could not be added in OT, so that the past form was prefixless, yielding an aspirated stop. Here again, Cone innovates in generalizing the unvoiced stop on the model of the other conjugations. The verb ‘drill, bore’ illustrates this evolution:

	PR	PS	IMP
OT	ɦbigs	phug < *pug < *b-pug	phug
expected Cone	*mbi²	*pʰʉ¹	*pʰʉ¹
attested Cone	mbʉ²	pʉ¹	pʉ¹

In this verb, none of the attested form are inherited. The u/i ablaut in the present tense and aspiration in the past and imperative were lost by analogical leveling.

Verbs with ky-stems also present analogical leveling. Since bky- regularly becomes ɕ¹, the expected paradigm of verbs such as ‘raise’ should be:

	PR	PS	IMP
OT	ɦgyogs	bkyags	khyog
expected Cone	ndʑu²	*ɕɑ¹	*tɕʰu¹
attested Cone	ndʑu²	tɕɑ¹	tɕu¹

The conjugation of this kind of verbs has been remodeled after c-stems, where tɕ- is found in the past and imperative stems.

4.2.2.3 Prenasalized / fricative

A few verbs in OT had an alternation between between prenasalized affricates in the present stem and voiced fricatives in the other stems. Two patterns were observed, one with dentals and the other with alveolo-palatals.

	PR	PS	FT	IMP
seize	ɦdzin	bzung <* bdzuŋ	gzung < *gdzuŋ	zung <*dzuŋ
put	ɦjog	bzhag < *bdʑak	gzhag <*gdʑak	zhog < *dʑak-o

As Li (1933) and Coblin (1976) point out, the fricatives here comes from voiced affricates in proto-Tibetan. Note that the affricates dz- and j- never appear in word-initial position (except in loanwords and expressive words) or after g- and b-. In fact, the voiced fricatives z and zh- are in quasi-complementary distribution with them, and should be reconstructed as affricates [13] since they correspond to voiced/prenasalized affricates in Rgyalrong, Lolo-Burmese and other languages, as the following table illustrates:

	Tibetan	Japhug Rgyalrong	Lolo-Burmese
eat	za < *dza	ndza	*dza² (Bradley 1979)
bridge	zam < *dzam	ndzom ˂ *ndzam	*dzam¹
dew	zil < *dzil		*ʔ-dzi² (Matisoff 2003:187)
burning smell	gzhob < *kdʑop	ɣndʑɤβ ˂ *kndʑɔp[14]	

There were no voiced fricatives in proto-Tibetan. The expected paradigms in Cone should be:

	PR	PS	IMP
OT	ɦdz	bz	z
expected Cone	ndz²	z²	s²
attested Cone	ndz²	z²	z²
OT	ɦj	bzh	zh
expected Cone	ndʑ²	ɣ²	x²
attested Cone	ndʑ²	ɣ²	ɣ²

We should find voiceless fricatives with low tone in the imperative forms, as imperative stems were not prefixed in OT. However, the imperative was renewed in analogy to the past stem.

A third category of prenasalized stop / fricative alternation is found in Cone, but it is unrelated to these OT alternations. It is in fact a variant of the prenasalized / high tone unvoiced alternation. In alternating by-stems, the expected paradigm would be:

	PR	PS	IMP
OT	ɦby-	phy-	phy-
expected Cone	ndʑ-	ɕʰ	ɕʰ

This is exactly the paradigm observed for the verb ‘open’, in OT *ɦbyed*, *phye*, *phyes*, Cone ndʑer², ɕʰer¹, ɕʰer¹. Although the final –r cannot be explained, the consonantal alternation is entirely regular.

4.2.2.4 Aspirated / unaspirated

This category of verbs had a nasal prefix in the present stem and a b- prefix in the past stem.

[13] Of course, zh- also originates from laterals in words such as <zhim> ‘sweet’ < *ljim.

[14] This noun meaning ‘burning fire’ is an irregular nominal form of *ndzɤβ* ‘to burn’, the anticausative of *tɕɤβ* < *tɕɔp ‘burn tr.’

The regular evolution from OT should be:

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
tʰ	ɦth	t¹	bt	tʰ	th
tsʰ	ɦtsh	ts¹	bts	tsʰ	tsh
tɕʰ	ɦch	tɕ¹	bc	tɕʰ	ch
tɕʰ	ɦkhy, ɦkhr	ɕ¹	bky, bkr	tɕʰ	khy, khr
kʰ	ɦkh	k¹	bk	kʰ	kh

The attested forms are :

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
12	tʰ	ɦtsh	t¹	bts	t¹	tsh
13	tsʰ	ɦch, ɦkhy, ɦkhr	ts¹	bc, bky, bkr	ts¹	ch, khy, khr
14	tɕʰ	ɦkh	tɕ¹	bk	tɕ¹	kh

Here again, the imperative forms have been entirely renewed. The expected tɕʰ- / ɕ¹ alternation of ky- and kr-stem verbs has also been levelled out, as illustrated by the paradigm of the verb ‘wash’;

	PR	PS	IMP
OT	ɦkhrud	bkrus	khrus
expected Cone	tɕʰi¹	ɕiː¹	tɕʰiː²
attested Cone	tɕʰi¹	tɕiː¹	tɕiː¹

4.3 Suppletive stems

In the previous sections, we have seen that the verb ‘do’ ɕi² was in fact an innovative suppletive verb in Cone. It is not the only suppletive verb in Cone. We also find the following three examples:

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
ndʉ²	ɦdug	de²	bsdad	dɪ²	sdod
jʉː²	yong	pi²	bud	xʰu¹	shog
ndʑɔ²	ɦgro	sʰuː²	song	sʰuː²	song

The patterns of suppletion observed in these verb are quite common accross Tibetan languages, expecially Amdo Tibetan.

5. Vocabulary

Most of the Cone vocabulary originates from OT, either directly inherited or borrowed from some other Tibetan languages. We find however three categories of words which cannot be directly compared with their OT or classical Tibetan equivalent: semantic innovations of standard Tibetan words, words inherited from an OT dialect distinct from literary OT, and words without clear Tibetan etymology.

5.1 Semantic innovations

We find in Cone words whose meaning has undergone innovation with regards to

their usage in OT or even Classical Tibetan, and compounds made of well-known Tibetan root but unattested as such in the written language. We provide here a list of the most significant forms:

/dzeː²/ ‘speak’ <bzlas>. The meaning of the verb <zlo, bzlas> in Classical Tibetan is ‘repeat, recite’ as in:

(1)	*sngags*	*kyang*	*bzlas-pa*	*bya-ste /*	*de*	*skad*	*cig*	*gis*
	mantra	also	recite.PS-NMLZ	AUX-CONV	DEM	instant	one	ERG
	smyo-ba-r		*ɦgyur-zhing*	*zhag*	*bdun*	*gyis*	*ɦchi-ɦo /*	
	mad-NMLZ-DAT		change.PRS-CONV	day	seven	ERG	die.PRS-ASSERTIVE	

He recites the mantra and that person will instantly go insane and then die within seven days (Siklos 1993:73).

The Chinese-Tibetan dictionary records the meaning ‘say’ (as in *gtam zlo.ba* ‘to talk’) but it is clearly not the common usage of this verb in most varieties of Tibetan. Cone however is not isolated in having selected this root as the basic verb ‘say’. Other outlier eastern Tibetan languages also do, as Zhonggu (Sun 2003:823) and Baima (Chirkova 2008). This could potentially be a common innovation relevant to language subgrouping.

/tʰɔ²reː²/ ‘tomorrow’ <tho.rengs>. The original meaning of this root is ‘dawn’. The semantic change ‘dawn, morning’ > ‘tomorrow’ is well-attested cross-linguistically. The same innovation is found in Zhongu and some Amdo dialects such as Hongyuan (Sun 2003:836), but not in Baima.

/tʂʰɑ²ŋgɔ¹/ ‘shoulder’. This word goes back to an unattested compound *phrag.mgo, litterally ‘the head of the shoulder’.

/næ²χtɕɑ¹/ ‘wife’. Reconstructed back to OT, this word would be *nag.chags, a colorful *bahuvrīhi* whose litteral meaning is ‘the one who has dark desires’. Compare the term <nag.mo> ‘the black one’ for ‘woman’ in CT.

/sɑː²ŋgɔ¹/ ‘bald person’. The corresponding OT form would be *zangs.mgo, a *bahuvrīhi* meaning ‘the one whose head is (polished like) brass’.

/sə²mbə¹ ɲɛ¹tɑ¹/ ‘firefly’. A complex compound such as *srin.ɦbu.me.stag ‘demon bug, fire tiger’ must be reconstructed here.

/tɕʰə²rɔ¹pʰæ²χtsɑː¹/ ‘temple’. This puzzling form goes back to *khyi.ro.phag.tshang ‘dog corpse and hog den’.

/tɔ²tsʰɪ¹/ ‘this year’. We reconstruct *do.tshod here: do- is a prefix found in forms like <do.nub> ‘tonight’, <do.zhag> ‘these days’ and <tshod> means ‘time’.

/mə²ndzʉ̵ː¹wãː²/ ‘snail’. The syllable ndzʉ̵ː² (with tonal alternation) clearly reflect the verb <ɦdzul> ‘to go into (a hole)’, probably referring to the snail pulling himself back into its shell. The first syllable mə- is however certainly not the negation <mi->, an it is not entirely clear how this compound is to be analyzed.

/kʰuː²/ ‘hurt (it.)’. Two etymologies are possible for this verb, either <ɦkhong> ‘dislike’ or <ɦkhol> ‘boil’.

5.2 Non-standard proto-forms

The OT dialect ancestor to Cone was not exactly identical to the literary OT language attested in Dunhuang texts and imperial inscriptions, and from the classical language.

We have sometimes to reconstruct a proto-form that is a variant of the standard etymon. These words have already been discussed in section 3.

As mentioned in 3.1, we find four words with m- initial in Classical or Old Tibetan by high tone in Cone, which go back to etyma with a preinitial in proto-Cone: ɲɛ¹ 'fire' <me> *Cmye, ɲə¹ 'man' <mi> *Cmyi, ɲi¹ 'swallow' <mid> *Cmyid and ɲĩː¹ 'name' <ming> from *Cmying.N with a nasal suffix explaining the secondary nasalization.

/ʐõː¹/ 'thick' comes from *sbrom, a -r- infixed variant of standard <sbom>.

/mbʉ̃ː²wãː¹/ 'bee' comes from *ɦbung.ma with a nasal prefix. The Classical form is <bung.ba>.

/ndʑer², ɕʰer¹/ 'open' from *ɦbyer, *phyer rather than classical <ɦbyed, phye>

Various other irregular correspondences could be interpreted as a retention from non-standard features of proto-Cone. For instance, /kʰə²sʰər¹/ 'fist' perhaps points to proto-Cone *khu.sur instead of the classical form <khu.tshur>, /dzæ²/ 'rust' to proto-Cone *rdza rather than classical <btsa>. Additional data from other Tibetan languages and literary texts however are needed to confirm these hypotheses.

5.3 Words without clear etymology

Some words in Cone have no clear etymology in literary forms of Tibetan. This includes the following:

Cone	meaning	possible proto-Cone origins
tɛ²pʰɔ¹	rooster	*de.pho
dʑɑː²mæ¹	young girl	*rgy[ang,al].ma
xɑː²ɣiː¹	child	*zh[ang,al].[b,g]zh[us,is,il,ing]
æ²pɔ¹	baby	*a.Cpo
ʐiː¹	sweep	*s[b,g]r[us,is,il,ing]
ʑiː²	twist fibers to make a rope	*sby[us,is,il,ing]
pər²	crispy	*bur (perhaps related to <bu.ram> 'sugarcane')
dʑʉ̃²	rafter	*[rj,sgy,rgy][ib,ug,ub]
dzɑː²	uterus (of animals)	*[rdz,zl][ang,al,a.ba]
dər²	thick (of liquids)	*[bd,sd]ur
də²mmãː¹	broom	*[bd,sd]uC.ma
æ¹ xi¹	piglet	*a.[gsh,zh][ig,id,ud]

Note that none of these words seem to come from Rgyalrongic or Qiang languages; there is no evidence of a 'Qiangic' substratum in Cone.

6. The place of Cone among Tibetan languages

It is commonly accepted among Tibetologists such as Sun (2003) that the traditional division between Dbus/Gtsang, Khams and Amdo of the Tibetan languages spoken in the PRC-controlled area of the Tibetan world has limited empirical value. Most of the outlier Eastern dialects, such as Zho.ngu, Kha.long, Chos.rje, The.bo, Baima, Co.ne, Mbrug.chu and others, are not in any way relatable to either Amdo or standard

Khams.

Although the general outlook of tonogenesis and the development of alveolo-palatals fricatives in Cone is quite similar to that of typical Khams dialects such as Sba.thang (see Gesang Jumian 2002:73-5), the following phonological innovations are unusual:

Sound change	Note
spr-, sr- > ʂ-, sbr- > ʐ-	Found in Zhongu (Sun 2003 :797), but in that dialect spr- and sr- do not merge. It is not a shared innovation between Cone and Zhongu.
Vl, Vng > V:	
exclusive merger of –ub, –ib, –ug	
exclusive merger of –ab, –ad	
r-metathesis	Found in words such as ŋær¹ <rnga> ‘drum’.

Since sound changes easily spread accross language boundaries, they are of limited value to classify languages in general, especially broad changes like tonogenesis. Besides, archaisms (such as the preservation of final –r) have no value whatsoever in dialect classification.

The most important morphological innovation of Cone is without doubt the formation of the genitive and of the dative, whose complex history has been studied in 4.1.1. If a genitive in *-b could be reconstructed in any other Tibetan language, this would be an important argument for subgrouping.

Lexically-specific innovations such as ‘say’ and ‘tomorrow’ (see section 5.1) also constitute important evidence for classifying Cone. Other major lexically-specific innovations include the suppletive verbs, in particular ‘do’ (see 4.2.1.2), whose paradigm is unlike anything found in the main dialects.

7. Conclusion

Cone, although not yet a moribund language like Zhongu, is fluently spoken only in a limited area, and critically endangered of disappearing in profit of Chinese. The present paper is only a short introduction to this language, and an in-depth research involving extensive text collection is a task of utmost urgency. Much of the morphology and the syntax of this language still waits to be described in detail. Besides, a dialectal survey of the different variety of Cone would be a worthwhile enterprise given their considerable divergence.

References

Bradley, David 1979. *Proto-Loloish*. Scandinavian Institute of Asian Studies Monograph Series 39. London and Malmö: Curzon Press.

Chirkova, Katia 2008 *On the Position of Baima within Tibetan: A Look from Basic Vocabulary*, Alexander Lubotsky, Jos Schaeken and Jeroen Wiedenhof (Ed.) *Evidence and counter-evidence : Festschrift F. Kortland.* Amsterdam : Rodopi (forthcoming 2008). Vol. II: General linguistics. Pp. 69-91.

Coblin, W.South 1976 Notes on Tibetan Verbal Morphology, *T'oung Pao* 52:45–70.

Gesang Jumian (Skal.bzang ɦgyur.med) 2002. *Zangyu fangyan gailun* [An Introduction to Tibetan Dialects]. Beijing: Minzu Chubanshe.

Hill, Nathan. 2004. Compte rendu (Review of Paul G. Hackett, *A Tibetan Verb Lexicon*, 2003). *Revue d'Etudes Tibétaines* 6: 78-98.

Hill, Nathan 2005 The verb ‘bri ‘to write’ in Old Tibetan. *Journal of Asian and African Studies*, 68:177-182.

Hill, Nathan 2006. Tibetan vwa ‘fox’ and the sound change Tibeto-Burman *wa –> Old Tibetan o. *Linguistics of the Tibeto-Burman Area*, 29.2:75-90.

Hill, Nathan 2007. Aspirate and non-aspirate voiceless consonants in Old Tibetan. *Language and Linguistics*, 8.2:471-493.

Hill, Nathan 2010. An overview of Old Tibetan synchronic phonology. *Transactions of the Philological Society*, 108.2:110-125.

Hua Kan, Longbojia 1993. *Anduo zangyu kouyu cidian.* 安多藏语口语词典 Lanzhou: Gansu minzu chubanshe.

Jacques, Guillaume 2009. Tibetan wa-zur and Laufer's law, *Linguistics of the Tibeto-Burman Area* 32.1: 141-144.

Jacques, Guillaume 2010a. A possible trace of verbal agreement in Tibetan. *Himalayan Linguistics* 9.1:41-49.

Jacques, Guillaume 2010b. Notes complémentaires sur les verbes à alternance 'dr– / br– en tibétain, *Revue d'Etudes Tibétaines* 19: 27-29.

Jacques, Guillaume 2011. A panchronic study of aspirated fricatives, with new evidence from Pumi, *Lingua* 121.9:1518-1538.

Li Fang-Kuei 1933. Certain Phonetic Influences of the Tibetan Prefixes upon the Root Initials. *Bulletin of the Institute of History and Philology* 6.2: 135-157.

Matisoff James A. 2003. *Handbook of Proto-Tibeto-Burman*, Berkeley and Los Angeles: University of California press.

Prins, Marielle 2002. *The Nyin pa (Niba) dialect of Co ne (Zhuoni)*, GBS (Gesellschaft für bedrohte Sprachen), Bulletin report 8. http://www.uni-koeln.de/gbs/

Rnam.rgyal Tshe.bstan (那加才旦) 2008. *Co.ne'i Bod skad la dpyad pa* [藏语卓尼话研究]. 中央民族大学硕士论文 [Zhongyang minzu daxue shuozhi lunwen].

Qu Aitang 瞿靄堂 1962. *Zhuoni zangyu de shengdiao yu shengyunmu de guanxi* [The relationship between tones, initials and rimes in Cone Tibetan], 卓尼藏语的声调与声母的关系 Zhongguo yuwen 331-339.

Sagart, Laurent and Xu Shixuan 2001. History through loanwords : the loan

correspondences between Hani and Chinese. *Cahiers de Linguistique Asie Orientale* 30.1:3-54.

Siklos, Bucsu, 1993. Datura Rituals in the Vajramahabhairava-Tantra. *Curare* 16:71-76.

Sun, Jackson T.-S. 2003a. Variegated tonal developments in Tibetan. *Language Variation: Papers on variation and change in the Sinosphere and in the Indosphere in honour of James A. Matisoff. Pacific Linguistics*. Canberra: Pacific Linguistics, Research School of Pacific and Asian Studies, ANU.

Sun, Jackson T.-S. 2003b. Phonological profile of Zhongu: A new Tibetan dialect of Northern Sichuan. *Language and Linguistics* 4.4:769-836.

Sun, Jackson T.-S. 2006. Special Linguistic features of gSerpa Tibetan. *Linguistics of the Tibeto-Burman Area* 29:107-125.

Tournadre, Nicolas 2010. The Classical Tibetan cases and their transcategoriality, From sacred grammar to modern linguistics, *Himalayan Linguistics* 9.2:87-125.

Yang Shihong 杨士宏 1996. *Yi he liang jiang liuyu zangyu fangyan huiyao* 一河两江流域藏语方言会要. Lanzhou: Gansu Minzu Chubanshe.