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A phonological profile of Cone¹

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 $ɲə^2mbæ^1$), 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 $təə^2nɛ^1$. 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 Rnamgyal (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	
p ^h	t ^h			k ^h	
b	d			g	
mb	nd			ŋg	
	ts	tɕ	tɕ̥		
	ts ^h	tɕ ^h	tɕ̥ ^h		
	dz	dʒ	dʒ̥		
	ndz	ndʒ	ndʒ̥		
m	n	ɲ		ŋ	
	s	ɕ	ɕ̥	x	h
	s ^h	ɕ ^h	ɕ̥ ^h	x ^h	
	z	ʒ	(z̥)	ɣ	(ɣ̥)
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 /x^h/ is excessively rare, but clear minimal pairs can be found (see below). [z̥] is an allophone of /r/ (phonetically a fricativized alveolar trill [r̥]) in the high tone. The status of [ɣ̥] is problematic, and will be discussed below.

The following examples illustrate all the consonantal phonemes of Cone:

/p/	/pʉ:¹/ ‘to heap, to stack’ <dpung>, /pə¹/ ‘hair’ <spu>
/p ^h /	/p ^h ʉ:²/ ‘to push’ <fiphul>, /p ^h ɑ¹/ ‘pig’ <phag>,
/b/	/bɑ:²/ ‘to soak’ <sbang>, /be:²/ ‘to bury’ <sbas>
/mb/	/mbɑ:²/ ‘mask’ <fībag>, /mbə²/ ‘worm’ <fibu>
/m/	/mɑ¹/ ‘soldier’ <dmag>, /me:¹/ ‘wound’ <rmas>
/w/	/wæ²/ ‘fox’ <wa>, /wõ_²mbæ¹/ ‘deaf’ <fon.pa>
/t/	/tɑ¹/ ‘tiger’ <stag>, /tʉ¹/ ‘to chop’ <gtub>
/t ^h /	/t ^h ɑ¹/ ‘to grind’ <fīthag>, /t ^h ʉ¹/ ‘to meet’ <thug>
/d/	/dɑ²/ ‘to lick’ <ldag>, /dʉ:²/ ‘to hit’ <rdung>
/nd/	/ndæ²/ ‘arrow’ <mda>, /ndʉ²/ ‘to sit’ <fidug>
/ts/	/tsɑ:¹/ ‘to beg’ <bslang>, /tsʉ¹/ ‘fontanelle’ <gtsug>
/ts ^h /	/ts ^h ɑ:²/ ‘nest’ <tshang>, /ts ^h ʉ:²/ ‘to sell’ <fītshong>
/dz/	/dzɑ:²/ ‘moon’ <zla.ba>, /dze:²/ ‘to speak’ <bzlas>
/ndz/	/ndzɑ²/ ‘yak-bull hybrid’ <mdzo>, /ndzʉ²/ ‘to insert’ <fīdzugs>
/n/	/næ¹/ ‘snot’ <snabs?>, /nʉ²/ ‘west’ <nub>
/s/	/sæ²/ ‘to eat’ <za>, /sʉ²/ ‘to bark’ <zug>
/s ^h /	/s ^h ɑ:²/ ‘ground’ <sa.ba>, /s ^h ʉ:²/ ‘basket’ <sle.bo>
/z/	/zɑ:²/ ‘good’ <bzang>, /zu:²/ ‘carpenter’ <bzo.ba>
/l/	/lɑ:¹/ ‘deer’ <gla.ba>, /lʉ:²/ ‘wind’ <rlung>
/ɬ/	/ɬæ¹/ ‘god’ <lha>, /ɬʉ:²/ ‘to fall’ <lhung>
/tɕ/	/tɕɑ¹/ ‘iron’ <lcags>, /tɕæ²/ ‘tea’ <ja>
/tɕ ^h /	/tɕ ^h ɑ¹/ ‘blood’ <khrag>, /tɕ ^h ʉ:²/ ‘small’ <chung>

/dz/	/dza ² / ‘to be full’ <rgyags>, /dzu ² / ‘to run’ <rgyug>
/ndz/	/ndzu ² / ‘to raise’ <figyog>, /ndzu ² / ‘to suck’ <fjub>
/ɲ/	/ɲæ ² / ‘fish’ <nya>, /ɲu ² / ‘little’ <nyung>
/ɕ/	/ɕe ² / ‘mouse’ <byifu>, /ɕu ² / ‘to paint’ <byug>
/ɕ ^h /	/ɕ ^h e ² / ‘marmot’ <fiphyi.ba>, /ɕ ^h ɛ ¹ / ‘flour’ <phye>
/z/	/zi ² / ‘to twist (a rope)’ <?>, /zæ ² / ‘to glue’ <sbyar>
/j/	/ja ² / ‘light’ <yang>, /ju ² / ‘country’ <yul>
/tʂ/	/tʂa ² / ‘cliff’ <brag>, /tʂu ² / ‘six’ <drug>
/tʂ ^h /	/tʂ ^h e ¹ / ‘horizontal’ <fiphred>, /tʂ ^h u ¹ / ‘to rob’ <vphrog?>
/dz/	/dzæ ² / ‘sound’ <sgra>
/ndz/	/ndzɛ ² / ‘rice’ <fibras>, /ndzu ² / ‘dragon’ <fbrug>
/ʂ/	/ʂe ¹ / ‘bridle’ <srab>, /ʂu ¹ / ‘to protect’ <bsrung>
/ʂ ^h /	/ʂ ^h e ² / ‘coarse’ <hral>
/r/	/ru ² / ‘to rot’ <rul>, /zu ¹ / ‘snake’ <sbrul>,
/k/	/ka ¹ / ‘marrow’ <rkang.ba>, /ku ¹ / ‘to push’ <skul>
/k ^h /	/k ^h a ² / ‘snow’ <kha.ba>, /k ^h u ¹ / ‘hole’ <khung>
/g/	/ga ² / ‘to stride’ <brgal>, /gu ² / ‘to wait’ <sgug>
/ŋg/	/ŋgɔ ² / ‘head’ <mgo>, /ŋga ² / ‘to block’ <figag>
/ŋ/	/ŋɔ ² / ‘face’ <ngo>, /ŋu ¹ / ‘silver’ <dngul>
/x/	/xə ² / ‘to melt’ <zhu>, /æ ¹ .xi ¹ / ‘piglet’ <?>, /xu ¹ / ‘plough’ <gshol>, /xa ² wɔ/ ‘mother’s brother’ <zhang.bo>
/x ^h /	/x ^h ə ¹ / ‘to die’ <shi>, /x ^h i ¹ / ‘louse’ <shig>, /x ^h u ² / ‘place where one sat before’ <shul>, /x ^h a ² / ‘deer’ <shva.ba>
/ɣ/	/ɣa ² / ‘female genital organs’ <gzhang>, /ɣə ² / ‘to cause to melt’ <gzhu>
/h/	/hi ¹ / ‘to take off’ <phud>, /hu ¹ / ‘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 z-) 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, nt^h, nts^h, ntɕ^h, ŋk^h). [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
lɛχ ² tɕ ^h æ ¹	/læk ² .tɕ ^h æ/	tool	lag.cha
nɛχ ² tɕ ^h ɑ ¹	/næk ² .tɕ ^h ɑ/	wife	nag.chags
p ^h ɛχ ² tɕi ¹	/p ^h æk ² .tɕi/	lard	phag.tshil
sɔχ ² tī ¹	/sɔk ² .tī/	pestle	? gtun
tɕɔχ ² tɕɛ ¹	/tɕɔk ² .tɕɛ/	table	cog.tse
ŋɔk ¹ mæ ¹	/ŋɔk ¹ .mæ/	mane	rngog.ma

tɕəʁ ² rõ: ¹	/tɕəʁ ² .rõ:/	valley	grog.rong
t ^h ɕə ² ri: ¹	/t ^h ɕə ² .ri:/	far	thag.ring
tɕ ¹ qqa ¹	/tɕə ¹ .kə/	tiger.GEN	stag.gi
nə ¹ ntɕ ^h u ¹	/nə ¹ .ntɕ ^h u/	ear	rna.mchog
tɕ ¹ ŋk ^h æ ¹	/tɕ ¹ ŋ ¹ .k ^h æ/	autumn	ston.kha
la ² nt ^h i: ¹	/la ² .nt ^h i:/	palm	lag.mthil
tɕ ¹ ŋk ^h a: ¹	/tɕ ¹ ŋ ¹ .k ^h a:/	prison	btson.khang
dʒə ² ntə ²	/dʒə ² .ntə/	always	rgyun.tu

A marginal contrast between surface [ɕ] 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
ta ¹	tæ ¹ ɕə ²	tiger	dative	stag
ndu ²	ndɔ ² ɕæ ¹	colour	lexical	mdog
ndzu ²	ndzɔ ² ɕæ ²	to put	converbial	fjog
mæ ¹	mæ ¹ ɣə ¹	low	constative	dma
t ^h ɔ ¹	t ^h ɔ ² ɣə ¹	high	constative	mtho

Although the diachronic origin for this contrast is clear, its synchronic analysis is not straightforward. Positing a distinct phoneme /ɕ/ is not entirely satisfying not only because of its marginal status, but also because it considerably complexifies the morphological analysis. The sequences æɕV and ɔɕV 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). æɕV and ɔɕV alternate with –a 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 [ɕ] 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, tæ¹ɕə² and ndzɔ²ɕæ² are to be analyzed as /tæ¹.e/ and /ndzɔ².k-ɛ/ underlyingly. However, in view of the highly abstract character of this analysis, we prefer to maintain in our transcription the symbol ɕ 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. /tɕ^hə²tɔ¹/ ‘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
mə ¹ kkæ ¹	/mə ¹ .kæ/	fog	smug.pa
ɕ ^h ə ² t ^h i: ¹	/ɕ ^h ə ² .ti:/	heel	phyi.rting
æ ¹ ttæ ¹	/æ ¹ .tæ/	hoe	?
rə ² ppæ ¹	/rə ² .pæ	wisdom	rig.pa

næ ¹ ŋŋɔ ¹	/næN ¹ ŋɔ/	sky	gnam.ngo
ŋæ ¹ mmæ ¹	/ŋæN ¹ .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	i:	ɰ	ɰ:	u	u:	ĩ:	(ũ:)
ɪ	ɪ:						
e	e:			o	o:	ẽ:	õ:
ɛ		ə		ɔ			
æ				ɑ	ɑ:	ã	ã:

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>
- /i:/ /tsi:¹/ ‘to count, past’ <brtsis>, /ti:¹/ ‘to spread (a sheet), past’ <btings>, /ki:¹/ ‘to steal, past’ <brkus>
- /ɪ/ /tɪ²/ ‘to catch up’ <ded>, /pɪ²/ ‘Tibetan’ <bod>
- /ɪ:/ /tsɪ:¹/ ‘to cook, past’ <btsos>, /tɪ:¹/ ‘to watch, imperative’ <bltos>, /kɪ:¹/ ‘to dig, past’ <brkos>
- /e/ /tse¹/ ‘to cut’ <gtsab>, /te¹/ ‘to plant’ <btab>, /ke¹/ ‘to cover’ <bkab>
- /e:/ /tse:¹/ ‘to search, past’ <btsal>, /pe:²/ ‘wool’ <bal>
- /ɛ/ /rə²tse¹/ ‘summit’ <ri.rtse>, /ɛ¹sɛ¹/ ‘cotton’ <srin?>
- /æ/ /tsæ¹/ ‘grass’ <rtswa>, /tæ¹/ ‘horse’ <rta>
- /ɰ/ /tsɰ¹/ ‘top of the head’ <gtsug>, /tɰ¹/ ‘to cut off’ <gtub>
- /ɰ:/ /kɰ:¹/ ‘to push’ <skul>, /dɰ:²/ ‘to hit’ <rdung>
- /ə/ /tsə¹/ ‘to count’ <rtsi>, /kə¹/ ‘to steal’ <rku>
- /u/ /tu¹/ ‘to hang, imperative’ <thogs; analogical>, /ku¹/ ‘to block’ <khog; analogical>
- /u:/ /tu:¹/ ‘to think, imperative’ <thong; analogical>, /tsu:¹/ ‘to sell’ <btsongs>
- /o/ /ŋo¹/ ‘man, dative’ <mi.la>, /mbo²/ ‘bug, dative’ <fibu.la>

/o:/ /to:²/ ‘smoke’ <du.ba>, /lo:¹/ ‘lung’ <glo.ba>
 /ɔ/ /kɔ¹/ ‘to carve, present’ <rko>, /hú/ ‘target’ <phog>
 /a/ /ka¹/ ‘to block, past’ <bkag>, /ta¹/ ‘tiger’ <stag>
 /ɑ:/ /kɑ:¹/ ‘marrow’ <rkang>, /la:¹/ ‘deer’ <gla.ba>
 /ĩ:/ /pĩ:¹/ ‘incense’ <spos>, /jĩ:¹/ ‘name’ <ming>
 /ẽ:/ /tẽ:¹/ ‘felt’ <stan>, /tsẽ:¹/ ‘to sew, past’ <btsems>
 /ã/ /nã²/ ‘forest’ <nags>, /nã¹/ ‘pus’ <rnag>
 /ã:/ /nã:¹/ ‘sky’ <gnam>, /tã:¹/ ‘to speak, present/past’ <gtam, btams>
 /õ:/ /kõ:¹/ ‘thirsty’ <skom>, /tõ:¹/ ‘to speak, imperative’ <gtoms>

The vowel length contrast is neutralized with the low vowels /æ/, /ɔ/, /ɛ/ and the nasal vowels /ĩ:/, /ẽ:/, /õ:/. Only /ã:/ has a short counterpart /ã/ in a few words. The status of /ũ:/ as a phoneme is problematic, as it is only attested in a few items with palatal or alveolo-palatal initial: /jũ:²/ <nyol>, the imperative of /jã:²/ ‘to sleep’ <nyal>, /tɕũ:²wã:¹/ ‘Potentilla anserina’ <gro.ma> and /mbə² tɕũ:²wã:¹/ ‘ant’ <fibu.grog.ma>. There is no obvious minimal pair with /õ:/.

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’ <fdzer>, /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 ʊ ə) become long when there is no cluster or geminated consonant between the two syllables. For instance, ji¹ ‘eye’ <dmyig> becomes ji:¹ in ji:¹x^her¹ ‘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
nã: ¹	nã: ⁵⁵	sky	gnam
nã: ²	nã: ²⁴	inside	nang
nã ¹	nã ⁵²	pus	rnag
nã ²	nã ¹²¹	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 ʊ e o ə) 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 disyllable (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 –γə 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		suffixed form		meaning	etymology
underlying	realization	underlying	realization		
tæ ¹	tæ ⁵²	tæ ¹ γə	tæ ⁵⁵ γə ⁵⁵	to see	lta
tsə ¹	tsə ⁵²	tsə ¹ γə	tsə ⁵⁵ γə ⁵⁵	to count	rtsi
dæ ²	dæ ¹²¹	dæ ² γə	dæ ¹¹ γə ⁵⁵	to pursue	bda
zə ²	zə ¹²¹	zə ² γə	zə ¹¹ γə ⁵⁵	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}-γə/ to be realized *tæ⁵²γə¹¹ 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		suffixed form		meaning	etymology
underlying	realization	underlying	realization		
t ^h ɔ ¹	t ^h ɔ ⁵²	t ^h ɔ ² γə	t ^h ɔ ¹¹ γə ⁵⁵	high	mtho
x ^h ə ¹	x ^h ə ⁵²	x ^h ə ² γə	x ^h ə ¹¹ γə ⁵⁵	to die	shi
t ^h ɑ ¹	t ^h ɑ ⁵²	t ^h æk ² γə	t ^h ɛ ¹¹ qɑ ⁵⁵	to weave	fithag
p ^h e ¹	p ^h e ⁵²	p ^h ɛC ² γə	p ^h ɛ ¹¹ kkə ⁵⁵	to go	phebs

In dissyllabic words, when the first syllable is in the high tone, this tone spreads to the next syllable. For instance ɲe:¹ŋgɔ¹ ‘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 /rə²γu:/ ‘rabbit’ <ri.bong> can be realized either as [rə¹¹γu:⁵⁵] or [rə¹¹γu:²⁴].

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 <i>dby-</i>)	L	L (except <i>sbr-</i> and <i>sgr-</i>)

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 fi	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 zV¹. 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 /du:²/ ‘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	jɛ ¹	mye	me	H	L
man	jə ¹	myi	me	H	L
swallow	ji ¹		mid	H	L
eye	ji ¹	dmyig	mig	H	L
name	ji: ¹	mying	ming	H	L
husband	mæ ¹ qqæ ¹		mag.pa	HH	LH
milk	õ: ¹ wã: ¹		fo.ma	HH	LH
to believe	lõ: ²		brlom	L	H
wrinkled	jɛr ²		gnyer	L	H
to use	ku: ²		bkol	L	H
to dream	jə ² ji: ²	rmyi	rmi, rmis	L	H
lamp	kær ² mɛ ¹		dkar.me	LH	HH
first month	tɕæ ² kkæ ¹		gcig.pa	LH	HH
soul	nã: ² xhĩ: ¹		rnam.shes	LH	HH
chimney	kær ² kø: ¹		skar.gung	LH	HH
wheel	pɔ ² lɔ ¹		spo.lo	LH	HH
wolf	ɕæ ² ɲk ^h ə ¹		spyang.ki	LH	HH
white	kæ ² ru: ²		dkar.po	LL	HH
camel	ɲæ ² wõ: ²		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	tu-rme
eye	mig, dmyig	dmyig	tu-mɲaɳ <*mjaq
name	ming, mying	*Cmying	tɣ-rmi
husband	mag	*Cmag	tu-nmaɳ <*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 –a from OT –ag and –eg has a conjunct form æq-, the verb /tɕa¹/ ‘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
tʂ ^h a ² ŋgɔ ¹	*phrag.mgo	shoulder
la ² nt ^h i: ¹	lag.mthil	palm of the hand
da ² ndzɯ ¹	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	tæ ¹	rta	horse
e	ɛ	ndzɛ ²	fidre	ghost
i	ə	ndzə ²	fbri	female yak
o	ɔ	tɛɔ ²	gro	wheat
u	ə	mbə ²	fbu	bug

These straightforward correspondences have several exceptions.

First, the Old Tibetan suffixes *-ma* and *-mo* generally become *-wã:* and *-wõ:* respectively in Cone instead of regular *-mæ* and *-mɔ*, which are however also attested.

Second, in dissyllables whose second syllable is *-wã:*¹ from *-ma*, open syllable *-o* undergoes nasal assimilation and becomes *-õ:*.

OT	Cone	Example	etymology	meaning
o	õ	sõ: ¹ wã: ¹	so.ma	hemp
o	õ	õ: ¹ wã: ¹	fo.ma	milk
o	õ	ʂõ: ¹ wã: ¹	sro.ma	nit
o	õ	s ^h õ: ² wã: ¹	so.ma	new
o	ũ	tɛũ: ² wã: ²	gro.ma	Potentilla anserina

There is no explanation for why we find /ũ:/ not /õ:/ in the last word; compare the quasi-homonym /mbə² tɛũ:²wã:¹/ ‘ant’ <fbu.grog.ma>.

Third, we find some words with unexpected final *-r*:

OT	Cone	Example	etymology	meaning
a	ær	mær ¹ ɛæ ¹	rma.byā	peacock
a	ær	ŋær ¹	rnga	drum
e	er	ndzɛr ² , ɛ ^h er ¹	fbyed, 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	ɛæ ² wæ ¹	bye.ma	sand
e	i:	ɲi: ¹ wã: ¹	snye.ma	spike
e	i:	kæ ² li: ²	ga.le	slow
e	ɪ:	lã: ¹ wõ: ¹ tɕhi: ²	glang.po.che	elephant
e	e:	ge: ² gẽ: ²	dge.rgan	teacher
o	æ	gæ ² wã: ¹	sgo.nga	egg
o	ə	læ ² wã: ¹	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)	a	ta ¹	stag	tiger
	æq-	tæ ¹ qqæ ¹	stag.pa	birch
eg(s)	a	ʂa ¹	sreg	to burn
	æq-	ʂæ ¹ qqæ ¹	sreg.gi	to burn (conjunct)
ig(s)	i	x ^{h1}	shig	louse
	əC-	jə ¹ ppə ¹	rmig.pa	hoof
og(s)	u	tu ²	dog	narrow
	ɔq-	tɔ ² qqə ¹	dog.gi	narrow (conjunct)
ug(s)	u	gu ²	sgug	to wait
	əC-	gə ² kkə ¹	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 /a/; this is the sole diachronic origin of the rare vowel /ã/:

OT	Cone	Example	etymology	meaning
ag	ã	mbə ² nã ¹	fibu.nag	fly
		nã ¹	rnag	pus
		nã ²	nags	forest

We did not find the syllable */nã/ 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	k ^h æ ² læ ¹ ji ²	kha.la.yug	swallow (bird)
ug	i	xɔ ² ɛdi ¹	*zhabs.gdugs or *zhogs.gdugs?	umbrella
ug	i:	ji: ¹ wã: ¹	smyug.ma	bamboo

Third, the noun /ji¹/ ‘eye’ <dmyig>, when used as the first element of a compound never occurs as a conjunct form. Instead, we find the basic form with lengthened vowel:

OT	Cone	Example	etymology	meaning
ig	i:	ji: ¹ dzə ¹	<dmyig.rdzi>	eyelash
		ji: ¹ pa ¹	<dmyig.lpags>	eye
		ji: ¹ təə ¹	<dmyig.chu>	tears
		ji: ¹ x ^h er ¹	<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 $\text{ʂə}^2\text{qqa}^1$ ‘lasso’ seems to come from $\langle\text{zhags.pa}\rangle$, though the vowel correspondence does not fit well.

The rhymes with final –d present the following correspondences:

OT	Cone	Example	etymology	meaning
ad	e	se^1	bsad	to kill
	$\varepsilon\text{C-}$	$\text{s}\varepsilon^1\text{kk}\text{ə}^1$	bsad.gi	to kill (conjunct)
ed	ɪ	ndi^2	fided	to chase
	$\varepsilon\text{C-}$	$\text{nd}\varepsilon^2\text{kk}\text{ə}^1$	fided.gi	to chase (conjunct)
id	i	ji^1	*Cmyid	to swallow
	əC-	$\text{ja}^1\text{pp}\text{ə}^1$	*Cmyid.pa	oesophagus
od	ɪ	pi^2	bod	Tibetan
	$\varepsilon\text{C-}$	$\text{p}^h\varepsilon^2\text{pp}\text{ə}^1$	phod.pa	courage
ud	i	t^hi^1	mthud	to connect
	əC-	$\text{t}^h\text{ə}^2\text{kk}\text{ə}^1$	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	$\text{ti}^2\text{t}\text{ʂ}^h\text{ɔ}^1$	de.khrod	in the future
	ɔ	$\text{t}\text{ʂ}^h\text{ɔ}^2\text{m}\text{ə}^1$	tshod.ma	vegetable
	ɔC-	$\text{k}\text{ɔ}^1\text{pp}\text{ə}^1$	bkod.pa	manner
	ɔC-	$\text{nd}\text{z}\text{ɔ}^2\text{pp}\text{ə}^1$	figyod.pa	regret

We also find the following correspondences (not the effect of the vowel lengthening rule in the first syllable in $\text{ke}^1\text{w}\text{ə}^1$ and $\text{k}\text{u}^1\text{w}\text{ə}^1$).

OT	Cone	Example	etymology	meaning
ad	ɪ	ji^1	rmad	saddle's crupper
		$\text{t}\text{ɕ}^h\text{ə}^2\text{mi}^1$	chu.smad	lower reaches of a river
ed	$\text{e}/\varepsilon\text{C-}$	$\text{d}\text{z}\text{e}^2, \text{d}\text{z}\varepsilon^2\text{kk}\text{ə}^1$	brjed	forget
		$\text{t}\text{ʂ}^h\text{e}^1, \text{t}\text{ʂ}^h\varepsilon^1\text{re}$	fiphred	horizontal
		$\text{ke}^1\text{w}\text{ə}^1$	sked.ba	waist
id	$\text{u}/\text{əC-}$	$\text{t}\text{ʂ}^h\text{u}^1, \text{t}\text{ʂ}^h\text{ə}^2\text{kk}\text{ə}^1$	fikhrid	to teach
od	$\text{e}/\varepsilon\text{C-}$	$\text{t}\text{e}^1, \text{t}\varepsilon^2\text{kk}\text{ə}^1$	lhod	relaxed
ud	u	$\text{k}\text{u}^1\text{w}\text{ə}^1$	skud.ba	thread
ud	u	u^1du^1	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	ʂe^1	srab	thin
	$\varepsilon\text{C-}$	$\text{ʂ}\varepsilon^1\text{kk}\text{ə}$	srab.gi	thin (conjunct)

eb(s)	i	ti ¹	lteb	to fold
	e	nde ¹	fidebs	to plant
	ɛC-	tɛ ¹ kkə ¹ , nde ² kkə ¹	lteb.gi fidebs.gi	to fold (conjunct) to plant (conjunct)
ib(s)	ɯ	xɯ ²	zhib	fine (conjunct)
	əC-	xə ² kkə ¹	zhib.gi	fine
ub(s)	ɯ	tɯ ¹	gtub	to chop
	əC-	tə ¹ kkə ¹	gtub.gi	to chop (conjunct)

In our Cone data, the only example of –ob is jə²təē¹ ‘stirrup’ <yob.can>. We also find the following irregular correspondences:

OT	Cone	Example	etymology	meaning
ub	i	tə ² ni ¹	do.nub	tonight
abs	æ	næ ¹	snabs?	snivel, snot
abs	i	wæ ² li ¹	rba.rlabs	wave
ab	ɑ	dʒæ ² k ^h ɑ ¹	rgyal.khab	country
ibs	i/əC-	di ² , də ² kkə ¹	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	/tsəC ¹ -ə/ > tsə ¹ ɣə ¹	rtsib	rib
ugs	əC- > əɣ	/ts ^h əC ² -æ/ > ts ^h ə ² ɣæ ¹	tshugs.ka	appearance
og	ɔq- > ɔʁ	/ndɔk ² -æ/ > ndɔ ² ʁæ ¹	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)	ɑ:	tɛɑ: ¹	bcang	to hold tight
eng(s)	e:	t ^h ɔ ² re: ²	tho.rengs	tomorrow
ing(s)	i:	ri: ²	ring	long
ong(s)	u:	du: ¹	sdong	tree
ung(s)	ɯ:	lɯ: ¹	rlung	wind

In the second one, we have nasal vowels instead:

OT	Cone	Example	etymology	meaning
ang(s)	ã:	ɛã: ²	byang	north
eng(s)	ã:	kã: ² s ^h ã: ¹	gangs.seng	panther

ing(s)	ĩ:	ɲĩ: ¹	*Cmying	name
ong(s)	õ:	s ^h æ ² tõ: ¹	sa.dong	cave
ung(s)	õ:	sõ: ¹	gsungs	to say, honorific
	əN-	sɔ ² ŋgə ¹	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 sõ:¹, sɔ²ŋgə¹ above.

Outside of these two sets, we find four exceptions:

OT	Cone	Example	etymology	meaning
ong	i:	di: ² wā: ¹	gdong.ma	beam (house)
ong	ɔ	kɔ ² ŋæ ¹	gong.ba	collar
ang	æ	kæ ¹ wæ ¹	rkang.ba	foot; leg
ung	u:	p ^h u: ²	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)	ẽ:	ɲẽ: ²	nyan	to hear
	ɛN-	ɲɛ ² ŋgə ¹	nyan.gi	to hear (conjunct)
en(d)	ẽ:	tʂẽ: ²	dran	to miss so.
	ɛN-	tʂɛ ² ŋgə ¹	dran.gi	to miss so. (conjunct)
in(d)	ĩ:	ʂĩ:	sprin	cloud
	əN-	tɕ ^h ə ² mbæ ¹	mchin.pa	liver
on(d)	ẽ:	kẽ: ²	gon	to wear
	ɛN-	kɛ ² ŋgə ¹	gon.gi	to wear (conjunct)
	õ:	t ^h õ: ²	thon	to arrive
	əN-	t ^h ɔ ² ŋgə ¹	thon.gi	to arrive (conjunct)
un(d)	ĩ:	ndzĩ: ²	ɦdzin	to take
	əN-	ndzə ² ŋgə	ɦdzin.gi	to take (conjunct)

The rhyme –on has two distinct correspondences –ẽ: and –õ: 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	ɛ ¹ ŋɛ ¹	a.ngan	little finger
in	ɛ	ɛ ¹ sɛ ¹	srin ¹¹	cotton
on	u:	gu: ² mæ ¹	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)	ã:	sã:¹	bsam	to think
	aN-	sæ¹ŋgə¹	bsam.gi	to think (conjunct)
em(s)	ẽ:	ts ^h ẽ:²	fitshem	to sew
	εN-	ts ^h ε²ŋgə¹	fitshem.gi	to sew (conjunct)
im(s)	ĩ:	xĩ:²	zhim	delicious
	əN-	xə²ŋgə¹	zhim.gi	delicious (conjunct)
om(s)	õ:	kõ:¹	skom	to thirsty
	əN-	kə¹ŋgə¹	skom.gi	to thirsty (conjunct)
um(s)	ũ:	tsũ:¹	btsum	to wink
	əN-	tsə¹ŋgə¹	btsum.gi	to wink (conjunct)

We only find three exceptions to these correspondences:

OT	Cone	Example	etymology	meaning
am	ĩ:/əN-	nĩ:¹, nə¹ŋgə¹	bsnams	to smell
om	o:	so:²	zom	bucket
em	ε	jε¹ri:¹, jε¹kkə¹	g.yem (res)	to have sex

The vowel –o: in ‘bucket’ resembles the case of contracted syllables such as /t^ho:²/ ‘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	mæ¹ru:¹	dmar.po	red
		kæ²ru:²	dkar.po	white
		sæ¹rə¹	gsar	young (person)
		ŋgæ²ræ¹	mgar.ba	blacksmith
		kæ²ræ¹	dkar.ba	lime
er	e.rV	s ^h e:²ru:²	ser.po	yellow
or	ə.rV	sə²ræ¹	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	jær ¹ mæ ¹	g.yer.ma	Xanthoxylum
er	ε	s ^h ε ² tʃɑ ¹ , s ^h ε ² tʃɑ ¹	ser.drag	hail
er	i	si ² , sə ² kkə ¹	zer	speak, talk
ir	e	hær ² tce ¹	phal.spyir	about
ar	e:	te: ¹ kæ ¹	star.ka	walnut tree
ur	i	pi ² lẽ: ²	fibur.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)	e:	pe: ²	bal	wool
	ɑ:	gɑ: ²	brgal	to stride
el(d)	i:	tʃi: ² lɑ: ²	brel lang	anxious
il(d)	i:	si: ¹	bsil	cold
ol(d)	u:	ju: ¹	g.yol	cover
ul(d)	ʌ:	zʌ: ¹	sbrul	snake

These correspondences resembles those of rhymes in final *-ng*, except for *-el*. For *-al*, *-e:* is more common but *-ɑ:* 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	t ^h i ¹	thel	seal
		ndzi ²	fıbrıl	chess
el	e/εC-	ndze ² , ndze ² kkə ¹	fıgyel	to slip
el	er	ji: ¹ x ^h er ¹	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	ri: ² pær ¹	rus.sbal	turtle
		ɲæ ² dzær ¹	nga.rgyal	arrogant
		hær ² tce ¹	phal.spyir	about
al	æ.rV	dzæ ² ru: ²	rgyal.po	king

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

OT	Cone	Example	etymology	meaning
el	i.lV	tʃi: ² lə ¹	drel	mule
il	ə.lV	tce ² lə ¹	grıl	round

Finally, the following marginal correspondences are also attested:

OT	Cone	Example	etymology	meaning
al	ã:	ɲã: ² , ɲã: ² ɣə ¹	nyal	to sleep
ol	ũ:	ɲũ: ²	nyol	to sleep (imperative)

ol	o:	gɔ ² jo: ¹ dɔ ² s ^h o: ²	sgo.yol rdo.sol	tent fly coal
il	i:	s ^h ɔ ² ɲi: ¹	so.rnyil	gum
al	ɛC	k ^h ɛ ² mmæ ¹	mkhal.ma	kidney

The verb jã^2 ‘to sleep’ is the only one in $-\tilde{\text{a}}$: whose conjunct form is not $-\text{æN}$ -, and its imperative form is one of the rare words with the vowel $\tilde{\text{u}}$:. The expected reflexes of *nyal* and *nyol* would be $*\text{jã}^2$ and $*\text{jũ}^2$, that is the exact equivalents of jã^2 and jũ^2 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	e:	dze:	bzlas	to speak (past)
es	i:	x ^h i: ²	shes	to know
is	i:	ɛi: ¹	dkris	to attach
os	i:	tɪ: ¹	ltos	to see (imperative)
us	i:	tɛi: ¹	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	ĩ:	nã: ² x ^h ĩ: ¹	rnam.shes	soul
os	ĩ:	jã: ² ɣĩ: ² pĩ: ¹ ts ^h ĩ: ²	nyal.gos spos tshos	quilt incense pigment

Second, various irregularities in vowel correspondences:

OT	Cone	Example	etymology	meaning
es	ə	ɣə ² ni: ¹ lɔ ²	gzhes.ning.lo	the previous year
es	i:	ɣi: ² nã: ²	gzhes.nangs	in one year
es	i:	ɣi: ²	gzhes	to eat, honorific
es	i:	-ri:	res	reciprocal suffix
os	ɔ	gɔ ²	dgos	need
os	i:	ɛi:	byos	to do (imperative)
is	ə	k ^h e: ² rə ¹	kha.spris	milk skin

The case of the verb ‘to do’ is particularly puzzling. Its complete paradigm is present $\text{ɛi}^2/\text{ɛə}^2\text{kkə}^1$, past ɛe^2 and imperative ɛi^2 . From the OT paradigm *byed*, *byas*, *byos*, we would expect $*\text{ɛi}^2/\text{ɛə}^2\text{kkə}^1$, ɛe^2 and $*\text{ɛi}^2$. See section 4.2 for an explanation.

The form gɔ^2 for ‘need’ reflects a proto-form $*\text{dgo}$ 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 k^he:²rə¹ ‘milk skin’ is particularly interesting, as it attests resyllabification of the $s-$ of the second syllable. We have to suppose a non-canonical form $*\text{kha.spri}$ without final $-s$ in proto-Cone. This form underwent the change $*\text{spr-} > *sɪ-$ (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 k^he:²rə¹. Had resyllabification not taken place, a form like *k^hæ²ʂə¹ 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 –fu. 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	ɑ:	dza:	zla.ba	moon
e.ba	e:	te: ¹	lte.ba	navel
e.bo	u:	s ^h u: ²	sle.bo	large basket
efu	i:	ʂi: ¹	sprefu	monkey
i.ba	e:	dze: ²	lji.ba	flee
ifu	e:	œ: ²	byifu	mouse
i.mo	õ:	rõ: ²	ri.mo	mark
o.ba	o:	lo: ¹	glo.ba	lung
o.ba	u:	zu: ²	bzo.ba	carpenter
o.mo	õ:	ndzõ: ²	mdzo.mo	hybrid yak cow
u.ba	o:	jo: ²	yu.ba	handle

Note that Old Tibetan o.ba can become either /o:/ or /u:/ 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 /o:/, 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:

(C¹C²)C³(C⁴)V

Only C³ was obligatory. We call this position the true initial (in Tibetan *ming.gzhi*). C⁴

(the medial consonant or *hdogs.can*) could be any of {r l w y}. C¹ (the *sngon-fjug* preinitial) could be any of {b d g m ŋ} (note that ŋ 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 ŋ 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	k ¹	kor ¹	skor	to turn (tr.)
kh	k ^h	k ^h ə ¹	khu	soup
Nkh	k ^h	k ^h ær ¹	mkhar	wall
g	k ²	kê: ²	gon	to wear
(C)Cg	g ²	gæ ²	dga	to like
Ng	ŋg ²	ŋgɔ ²	mgo	head
(C)Cc	tɕ ¹	tɕi ¹	gcig	one
ch	tɕ ^h	tɕ ^h ə ¹	chu	water
Nch	tɕ ^h	tɕ ^h e: ²	mche.ba	fang
j	tɕ ²	tɕæ ²	ja	tea
(C)Cj	dʒ ²	dʒɛ ²	rje	to exchange
Nj	ndʒ ²	ndʒɛ ²	mje	penis
(C)Ct	t ¹	tã: ¹	gtam	to talk
th	t ^h	t ^h u: ²	thung	short
Nth	t ^h	t ^h u: ²	ŋithung	to drink
d	t ²	tær ²	dar	ice
(C)Cd	d ²	dɯ: ²	rdung	to hit
Nd	nd ²	ndɯ: ²	mdung	spear
(C)Cts	ts ¹	tsə ¹	rtsi	to count
tsh	ts ^h	ts ^h ɛ ¹	tshe	life
Ntsh	ts ^h	ts ^h ɔ ¹	mtsho	lake
(C)Cdz	dz ²	dzə ²	rdzi	to knead
Ndz	ndz ²	ndzɔ ²	mdzo	hybrid yak
(C)Cp	p ¹	pɯ: ¹	dpung	to stack
ph	p ^h	p ^h e ¹	phebs	to walk
Nph	p ^h	p ^h ər ¹	ŋphur	to fly
b	p ²	pe: ²	bal	wool
(C)Cb	b ²	be: ²	sbas	to bury
Nb	mb ²	mbə ²	ŋbu	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	nær ¹ tse ¹	sna.rtse	tip of the nose
		k ^h ær ² tsa ₋ ¹	kha.rtsang	yesterday
		mær ² tsæ ¹	ma.rtsa	capital (money)
dg	Vr.g	tœr ² gə ¹	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	hu ¹ , hœ ² qqə ¹	phog	to hit (the target)
		hi ¹	phud	to take off (clothes)
		hær ² tœ ¹	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	tœ ^h	ræ ² tœ ^h ɔ ¹	rwa.co	horn
		s ^h ẽ: ² tœ ^h ẽ: ¹	sems.can	animal
		næ ² χtœ ¹	nag.chags	wife
kh	ɣ	næ ¹ ɣœ: ¹	sna.khung	nostril
ch	c	ji: ¹ tœ ¹	mig.chu	tear
		t ^h œ ² tœẽ: ¹	mthe.chen	thumb
k	k ^h	œæ ² ŋk ^h ə ¹	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	ɲœ ¹ xœ: ¹	me.dpung	torch
sb	z ¹	zœ: ¹ , zœ ¹ ŋgə ¹	sbom (*sbrom)	thick
b	mb	mbœ: ² wã: ¹	bung.ba (*f̥bung.ma)	bee
f̥b	p	pi ² lẽ: ²	f̥bur.len	plane
gc	ts	tœœ ² tsi ¹	bcu.gcig	eleven
bts	dz	dzæ ²	btsa	rust
tsh	s ^h	k ^h œ ² s ^h œr ¹	khu.tshur	fist
rg	ŋg	ŋgã: ²	rgang	hedghog

Some of the examples above reflect borrowings from other dialects (such as ‘torch’) and will be studied in 3.4. The case of zœ:¹, zœ¹ŋgə¹ ‘thick’ however, is different. The Cone initial z– 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 *fibung.ma in proto-Cone. Other dialects have a prenasalized in this word such as Shuiluo Kami Tibetan mbō², a form whose proto-etymon is *fibuŋ.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	x ^h	x ^h ɑ: ²	sha.ba	deer
Csh	x ¹	xɑ ¹	bshags	to tear
zh	x ²	xɑ ²	zho	curd
Czh	ɣ ²	ɣæ ^{r2}	gzhar/bzhar	to shave
s	s ^h	s ^h ɔ ¹	so	tooth
Cs	s ¹	sɔ ¹	gso	to raise
z	s ²	sɔ ²	zo	to eat (imperative)
Cz	z ²	zɑ: ²	bzang	good
h	h	hæ ² kɑ ²	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 /z/ 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	wõ: ² mbæ ¹	ɦon.pa	deaf
ɦ	j	jɔ ² ɰæ ¹	ɦog	below
ɦ	-	ɛ ² kkæ ¹	ɦug.pa	owl
		õ: ¹ wã: ¹	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	ɕ ¹	ɕi: ¹	bshos	to give birth to
bzh	ɕ ²	ɕõ: ²	bzhon	to ride
sh	x ^h	lɰ: ¹ ɕ ^h æ ^{r1}	*rlung.shar	to winnow
gsh	ʂ ¹	ʂɔ ¹ qqæ ¹	gshog.pa	wing
zh	ʂ ²	ʂɔ ² qqæ ¹	zhags.pa	lasso, noose

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

The noun x^hæ²mbæ¹ ‘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	m ²	mɔ ²	mo	divination
Cm	m ¹	mæ ¹	dma	low
n	n ²	nɯ ²	nub	west
Cn	Cn	nɔ ¹	rno	sharp
ny	j ²	ɲæ ²	nya	fish
Cny	j ¹	ɲi: ¹ wæ ¹	rnying.ba	old
ng	ŋ ²	ŋɔ ²	ngo	face
Cng	ŋ ¹	ŋɯ: ¹	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 /ɲe:²/ ‘barley’ <nas> and /ɲe:²ŋɔ¹/ ‘pillow’ <sngas.mgo> with a palatalized initial. OT n– and ng– do not normally palatalize before –e or –as in Cone (for instance /ne:¹/ ‘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 –e: in Cone were borrowed from another Tibetan language.

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

OT	Cone	Example	etymology	meaning
r	r ²	rə ²	ri	mountain
sr	ʂ ¹	ʂe ¹	srab	bridle
hr	ʂ ^h	ʂ ^h e: ²	hral	coarse
l	l ²	le: ²	las	fate
Cl	l ¹	lɯ: ¹	rlung	wind
sl	ts ¹	tɕa: ¹	bslang	to beg for money
zl	dz ²	dza: ²	zla.ba	moon
rl	ʈ	ʈə ² kkæ ¹	rlig.pa	testicles
lh	ʈ	ʈæ ¹	lha	god
y	j ²	ja: ²	yang	light (adj)
g.y	j ¹	ja ¹	g.yag	yak
fw	w	wæ ²	fwā	fox

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

OT	Cone	Example	etymology	meaning
lh	h	hæ ² ndzu ¹	lham.fgrog	bootlace, shoelaces
		hæ ² ŋŋɔ ¹	lham.ngo	sole of boots
sl	s	sæ ¹ ŋæ ¹	sla.nga	pan
sl	s ^h	s ^h u: ²	sle.bo	large basket
sl	l ¹	læ ¹ , le: ²	sla, bsas	to spin
zl	d	dæ ² ndzĩ: ²	zla.fdzin	lunar eclipse

sr	s	sɛ ¹ wõ: ¹ ɛ ¹ sɛ ¹	sre.mong srin	weasel cotton
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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	ɛ ¹	ɛæ ¹	skra	hair
khr	tɕ ^h	tɕ ^h ɑ ¹	khrag	blood
Nkhr	tɕ ^h	tɕ ^h i ¹	ɦkhrud	to wash
gr	tɕ ²	tɕɔ ²	gro	wheat
(C)sgr	ʒ ¹	ʒi: ¹	sgril	to cause to roll
Ngr	ndʒ ²	ndʒã: ²	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	tʂ ^h	tʂ ^h õ: ² tʂ ^h õ: ¹	khrung.khrung	white crane
Nkhr	tʂ ^h	tʂ ^h i: ² wæ ¹	mkhris.ba	gallbladder
gr	tʂ ²	tʂõ: ² ntɕ ^h er ¹	grong.khyer	city
dgr	dz ²	dzæ ² wu: ¹	dgra.bo	enemy
(C)sgr	dz ²	dzæ ²	sgra	sound
Ngr	ndʒ ²	ndʒɤ: ² wæ ¹	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 ɛ– (tɕi:¹ ‘to wash (past)’ <bkrus>). We will see in section 4 that this form is analogical with the regular present tɕ^{hi} <ɦkhrud>.

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

OT	Cone	Example	etymology	meaning
dr	tʂ ²	tʂɛ: ²	dran	to miss, to think of
Ndr	ndʒ ²	ndʒɛ ²	ɦdre	ghost
spr	ʂ ¹	ʂi: ¹	sprin	cloud
phr	tʂ ^h	tʂ ^h ɑ ² ŋgɑ ¹	*phrag.mgo	shoulder
Nphr	tʂ ^h	tʂ ^h u ¹	ɦphrog	to rob
br	tʂ ²	tʂɑ ²	brag	cliff
sbr	ʒ ¹	ʒɤ: ¹	sbrul	snake
Nbr	ndʒ ²	ndʒɛ: ²	ɦbras	rice

Note that sbr– and sgr– both develop into the voiced fricative /z/ with a high tone. The word ʒõ:¹ ‘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 > z_l

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

OT	Cone	Example	etymology	meaning
sbr	dz _l	dzã:²tsə¹	sbrang.rtsi	honey
sbr	w	wæ²	sbra	tent
spr	tʂ	tʂə²	spri	beastings
spr	p	pa:¹wu:¹	sprang.po	beggar
fibr	ndz	ndzi²	fibrel	chess
dr	r	ɲæ²rɔ²	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	ɕa:¹	bskyal	to send
khy	tɕ ^h	tɕ ^h ə²ɣə¹	khyi	dog
Nkhy	tɕ ^h	tɕ ^h æ²qqæ¹	fikhyags.pa	ice
(C)Cgy	dz²	dze²	rgyab	back
Nggy	ndz²	ndzɔ²qqɔ¹	mgyogs.po	quick
spy	ɕ ?	ɕæ²ɲk ^h ə¹	spyang.ki	wolf
phy	ɕ ^h	ɕ ^h i:²	phyis	to wipe (past)
Nphy	ɕ ^h	ɕ ^h e:²	fiphyi.ba	marmot
by	ɕ²	ɕæ²	bya	bird
dbyy	j¹	jæ¹kæ¹	dbyar.ka	summer
sby	z²	zæ²	sbyar	to paste
Nby	ndz²	ndzæ²	fbyed	to open (present)

Note that the clusters /labial+y/ are the only regular origins of alveolo-palatal fricatives. This explains the absence of /z/ 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	ɣi:²	sbyin	to give
by	z	zə²ppæ¹	byin.pa?	calf (of the leg)
spy	tɕ	hæ²tɕe¹	phal.spyir	about
phy	x ^h	x ^h ə²zɔ¹	phyi?	outside
phy	tɕ ^h	tɕ ^h ə²ræ¹	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 ɑ: e: i: u: ʉ:	nasal vowel ã: î: õ:
B	al	ɑ:	e:
C	ph	p ^h	h
D	lh	ʈ	h
E	alveolo-palatals fricatives	velars	alveolo-palatals
F	velar+r	alveolo-palatal affricates tɕ tɕ ^h dʒ ndʒ and ʒ	retroflex affricates tʂ tʂ ^h dʐ ndʐ
G	Cky, labial+y	ɕ/ɕ ^h	tɕ/tɕ ^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:

- Since nouns are more easily borrowed than verbs, we should expect that only few verbs should appear in a borrowed layer of vocabulary.
- The borrowed layers should contain more cultural and religious vocabulary.
- Any form that reflect a proto-etymon different from that of the written corpus of Old Tibetan (such as zõ:¹ ‘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	ɑ:	da: ²	gdang	to open (the mouth)
		tɛɑ: ¹	bcang(s)	to hold tight
ing	i:	ti: ¹	bting(s)	to spread
		ʃi: ¹	sring	to stretch out
ong	u:	tsu: ¹	btsong(s)	to sell
		t ^h u: ²	mthong	to see
ung	ʊ:	t ^h ʊ: ²	ɦthung	to drink
		du: ²	rdung	to hit

The rare rhyme –eng is only attested in the word t^hɔ²re:² ‘tomorrow’ <tho.rengs> in this layer.

Here is the list of all words with nasal vowels:

OT	Cone	Example	etymology	meaning
ang	ã:	hæ ² jã: ²	ha.yang	aluminium
		ɛã: ²	byang	north
		nã: ²	nang	inside
		ndã: ²	mdang.nub	last night
		ŋgã: ²	rgang	hedgehog
		ŋã: ² wæ ¹	ngang.ba	swan, goose
		tɛã: ¹ wã: ¹	lcang.ma	willow
		mə ² nã: ¹	mi.snang	not to be
		dzã: ² kə ¹	ljang.ku	yellow
		jã: ¹ zær ¹	g.yang.gzar	steep cliff
		dzã: ² tsə ¹	sbrang.rtsi	honey
		s ^h ɑ: ² nã: ²	*sang.gnam	next year
		mã: ² , ma: ² ɣə ¹	mang	many
		tʃã: ² wõ: ¹ , tʃɑ: ² ɣə ¹	drang	straight
eng	ã:	kã: ² s ^h ã: ¹	gangs.seng	leopard
ing	ã:	ndzã: ² lã: ¹	ɦdzam.gling	world
		dzã: ² wə ¹	rdzing.bu	pool
ing	ĩ:	tɛ ^h ə ² xĩ: ²	chu.zhing	field
		x ^h ĩ: ²	shing	timber
		ŋĩ: ¹	ming	name
ong	õ:	tɛɔ ² rõ: ²	grog.rong	valley
		s ^h æ ² tõ: ¹	sa.dong	cave
		rõ: ² wə ¹	rong.ba	farmer
		k ^h õ: ² wə ¹	khong	pocket
		sɛ ¹ wõ: ¹	sre.mong	weasel
ung	õ:	ŋɛ ¹ xõ: ¹	me.dpung	torch
		tʃ ^h õ: ² tʃ ^h õ: ¹	kh rung	white crane
		sõ: ¹	gsungs	speak, talk (honorific)

Only one verb is found in this list (sõ:¹ <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 –ã: or –ĩ:, a feature which reflects different layers of borrowings. The correspondence –ing to –ã: must reflect recent loanwords from Amdo Tibetan, where OT –ing changes to –aŋ (<fdzam.gling> is Labrang *ndzamhlaŋ*, Hua Kan and Longbojia 1993).

The words se¹wõ:¹ ‘weasel’, jε¹xõ:¹ ‘torch’ and tɕ^hõ:²tɕ^hõ:¹ ‘white crane’ likewise present additional correspondences characteristic of loanwords: sr- > –s (instead of regular ɕ-), dp- > x- (a typical Amdo sound change) and khr- > tɕ^h- (see 3.4.3).

However, not all words with nasal vowels corresponding to velar nasal rhymes are borrowed. The two adjectives mǎ:² ‘much’ and tɕǎ:²wõ:¹ ‘straight’ have exceptional conjunct forms in –ɑ: (–ã: normally alternates with –æN-), mɑ:²γə¹ and tɕɑ:²γə¹ respectively. The nasality here might be secondary: we have seen that many lexical items, such as jǎ:² ‘to sleep’ <nyal>, pĩ:¹ ‘incense’ <spos> have non-etymological nasality, which probably results from the fusion with a suffix in nasal. This is also the case for mǎ:² and tɕǎ:²wõ:¹: in the latter, nasality most probably spread from the suffix –wõ:.

Other monosyllabic nouns with nasal vowel may also belong to the inherited layer. First, jĩ:¹ ‘name’ from a non-attested *Cmying: the irregular high tone would not be expected if it were a borrowing. Second, ŋǎ:² ‘hedgehog’, which ought to come from *ŋgang rather than attested <rgang>. Third, x^hĩ:² ‘wood’ <shing> could also potentially belong to the inherited layer, though this remains uncertain.

The bisyllabic word s^hɑ:²nǎ:² ‘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 –ɑ: and the borrowed layer –ã: 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 –e: is the most common one, and appears in the following examples:

Example	etymology	meaning
pe: ²	bal	wool
se: ¹	gsal	bright
ndze: ²	fjal	to compensate
ɕ ^h e: ²	hral	coarse, crude
ts ^h e: ² , tse: ¹	fitshol; btsal	to search
ndze: ²	mjal	to worship

re: ² wæ ¹	ral.ba	plait
dze: ²	rgyal	to win
tce: ¹	rkyal	to swim
be: ² wæ ¹	sbal.pa	frog
ge: ² ri: ²	sgal.rus	backbone
sh: ² de: ²	sos.dal	slow, late
th ^e : ²	thal	ashes

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

Example	etymology	meaning
ɕa: ¹ , ɕu: ¹	bskyal	to send
mba: ² , pa: ² , pu: ²	fibal	raise, pull
ga: ² , gu: ²	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 : –a: 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 mba:², pa:², pu:² ‘to pluck out’ <fibal, 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 tce:¹ ‘to swim’ <rkyal> presents the correspondence Cky– : tɕ-, which we will show is a characteristic of loanwords in 3.4.4, while ɕa:¹ ‘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 –i:, –u: and –o: respectively. An evolution –al > –a: merging with –ang is therefore more likely for the inherited vocabulary than –al > –e:. This argument is weakened however by the fact that –e: is not a reflex of Cone –el.

The correspondence –al to –e: occurs in one compound with –ang to –al : zɑ:¹th^e:¹ ‘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 : –e: instead of –al to –a: is the inherited correspondence, an idea which we have already rejected. Second, this word was borrowed from another Tibetan dialect after the change –al > –a: but before –ang > –a:. 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
ji: ¹ x ^h er ¹	dmyig.shel	glasses
ri: ² pær ¹	rus.sbal	turtle
ŋæ ² dzær ¹	nga.rgyal	arrogant
hær ² tœ ¹	phal.spyir	about

This represents a second layer of borrowing more recent than –al to –e-. 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 p^h- and l- 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	ɕ ¹	ɕa ¹	skrag	to be afraid
ɦkhr	tɕ ^h	tɕ ^h i ¹	ɦkhr̥id	to lead
gr	tɕ ²	tɕa ²	grags	to growl
ɦgr	ndz ²	ndzɔ ²	ɦgro	to go
sgr	z ¹	zɿ: ¹	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	tɕ ^h	tɕ ^h õ: ² tɕ ^h õ: ¹	khrung.khrung	white crane
		ti: ² tɕ ^h ɔ ¹	de.khrod	in the future
ɦkhr	tɕ ^h	tɕ ^h u ¹ , tɕ ^h ə ² kkə ¹	ɦkhr̥id	to teach
mkhr	tɕ ^h	tɕ ^h i: ² wæ ¹	mkhr̥is.pa	gallbladder
gr	tɕ	tɕõ: ² ntœ ^h er ¹	grong.khyer	town
		tɕæ ² wæ ¹	grwa.ba	monk
dgr	dz _ɿ	dzæ ² wu: ¹	dgra.bo	enemy
sgr	dz _ɿ	dzæ:	sgra	sound
ɦgr	ndz _ɿ	ndzə ² kkə ¹	ɦgr̥ig	correct, right
		ndzj: ²	ɦgr̥il	to roll
		ndzẽ: ² dər ¹	ɦgran.sdur	to compete

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	ʂi: ¹	sprehu	monkey
		ʂĩ: ¹	sprin	cloud
		ʂɑ: ¹	spra.ba	tinder
	p ⁻¹	pɑ: ¹ wu: ¹	sprang.po	beggar
	tʂ ⁻¹	tʂə ¹	spri	beastings
sbr-	z ⁻¹	zə ¹ kkə ¹	sbrid.gi	pungent
		zɰ: ¹	sbrul	snake
		zɑ: ¹	sbrang	fly
	dz ⁻²	dzã: ² tsə ¹	sbrang.rtsi	honey
	w ⁻²	wæ ²	sbra	tent

The inherited forms here are those where the clusters correspond to retroflex fricatives ʂ⁻¹ and z⁻¹. The correspondences to retroflex affricates are borrowings, in view of the fact that dzã:²tsə¹ <sbrang.rtsi> exemplifies the borrowed correspondence –ang : –ã: (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: ɕi:¹ ‘to give birth to’ <bshos> and ɕõ:² ‘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 : –õ: 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 (ʂə¹qqə¹ ‘wing’ <gshog.pa> and ʂə²qqə¹ ‘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	tɕæ ¹ gæ ¹	skya.sga	ginger
		tɕæ ¹ qqæ ¹	skyag.ka	excrement
rky	tɕ	tɕe: ¹	rkyal	to swim
spy	tɕ	hær ² tɕe ¹	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 p^h– : h-. This shows that this set of correspondences clearly reflect a borrowed layer. It also contains ‘to swim’, which has the correspondence –al to –e:, 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 –e: 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:

	∅	b	d	g	m	n	ŋ	r	l	s
a	æ	e	e	a	ã	ẽ	ɑ:	ær	ɑ:	e:
e	ɛ	ɪ / e	ɪ	a	ẽ	ẽ	e:	er	i: ?	ɪ:
i	ə	ɯ	ɪ	ɪ	ĩ	ĩ	i:	ər	i:	i:
o	ɔ		ɪ	u	õ	ẽ	u:	or	u:	ɪ:
u	ə	ɯ	ɪ	ɯ	õ	ĩ	ɯ:	ər	ɯ:	i:

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
a	æk
e	ɛC
ɪ	ɛC

i	əC
u	ɔk
ʉ	əC
ã:	æN
ẽ:	ɛN
ĩ	əN
õ:	ɔN

These conjunct forms are always predictable, except for some stems in ã: have an irregular conjunct forms a: 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	ɤb, ɤd, ɤg	ɤm, ɤn	ɤ
-C	gemination pp, tt, kk	disappears	gemination mm, nn, ŋŋ	ɤ
-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 > V:. At the same time, *ap > *at (perhaps also *ep > *et).

	∅	b	d	g	m	n	ŋ	r	l	s
a		at					a:		a:	
e							e:		e:	
i							i:		i:	
o							o:		o:	
u							u:		u:	

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

	∅	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt			ɛn	a:		a:	ɛs
e							e:		e:	
i							i:		i:	
o			et			en	o:		o:	es
u			it			in	u:		u:	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.

	∅	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ã:	ẽ:	a:		a:	ɛs
e					ẽ:	ẽ:	e:		e:	
i					ĩ:	ĩ:	i:		i:	
o			et		õ:	ẽ:	o:		o:	es
u			it		ũ:	ĩ:	u:		u:	is

4. Loss of –s and vowel lengthening. The original e: (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.

	∅	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ã:	ẽ:	a:		a:	ɛ:
e					ẽ:	ẽ:	ɛ:		ɛ:	e:
i					ĩ:	ĩ:	i:		i:	i:
o			et		õ:	ẽ:	o:		o:	e:
u			it		ũ:	ĩ:	u:		u:	i:

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

	∅	b	d	g	m	n	ŋ	r	l	s
a		ɛt	ɛt		ã:	ẽ:	a:		a:	ɛ:
e				ak	ẽ:	ẽ:	ɛ:		ɛ:	e:
i		up			ĩ:	ĩ:	i:		i:	i:
o			et		õ:	ẽ:	o:		o:	e:
u			it		ũ:	ĩ:	u:		u:	i:

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

	∅	b	d	g	m	n	ŋ	r	l	s
a		ɛʔ	ɛʔ	aʔ	ã:	ẽ:	a:		a:	ɛ:
e		eʔ	eʔ	aʔ	ẽ:	ẽ:	ɛ:		ɛ:	e:
i		uʔ	iʔ	iʔ	ĩ:	ĩ:	i:		i:	i:
o		oʔ	eʔ	oʔ	õ:	ẽ:	o:		o:	e:
u		uʔ	iʔ	uʔ	ũ:	ĩ:	u:		u:	i:

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	ã:	ẽ:	a:		a:	ɛ:
e	[ɛ]	eʔ	eʔ	aʔ	ẽ:	ẽ:	ɛ:		ɛ:	e:
i	ə	uʔ	iʔ	iʔ	ĩ:	ĩ:	i:	ər	i:	i:
o	[ɔ]	oʔ	eʔ	oʔ	õ:	ẽ:	o:		o:	e:
u	ə	uʔ	iʔ	uʔ	ũ:	ĩ:	u:	ər	u:	i:

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 > ʊ and o > u.

Additionally, ù merges with õ and ẽ 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	ã:	ẽ:	a:		a:	e:
e	[ɛ]	ɪʔ	ɪʔ	aʔ	ẽ:	ẽ:	e:		e:	ɪ:
i	ə	ʊʔ	iʔ	iʔ	ĩ:	ĩ:	i:	ər	i:	i:
o	[ɔ]	uʔ	ɪʔ	uʔ	õ:	ẽ:	u:		u:	ɪ:
u	ə	ʊʔ	ɪʔ	ʊʔ	õ:	ĩ:	ʊ:	ər	ʊ:	ɪ:

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 -e: 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
ɪ	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		
ʊ	ib, ub, ug	ud, id	
ə	i, u		
u	og	ud	
o			ur, ir, or
ɔ	o	od	
ɑ	ag, eg	ab	
i:	ing, il, (el), is, us, eŋu	e, es	
ɪ:	es, os	e	
e:	eng, as, e.ba, i.ba	al	
ʊ:	ung, ul		

u:	ong, ol, e.bo	on, o.ba
o:	o.ba, u.ba	ol
ɑ:	ang, al, a.ba	
ã	ag (in –nag–)	
ĩ:	in, un, im	am
ẽ:	an, en, on, em	
ã:	am	ang, eng
õ:	om, um, i.mo, o.mo o (followed by nasal suffix)	ong, on
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
p ¹	(C)Cp	spr
p ²	b	fib
p ^h	(f)ph	
b ²	(C)Cb	
mb ²	fib	b
t ¹	(C)Ct	
t ²	d	
t ^h	(N)th	
d ²	(C)Cd	
nd ²	Nd	
ts ¹	(C)Cts, (b)sl	gc
ts ^h	(N)tsh	
dz ²	(C)Cdz, (b)zl	bts
ndz ²	Ndz	
tɕ ¹	(C)Cc	bkr , (C)Cky, dpy
tɕ ²	j, gr	
tɕ ^h	(N)ch, (N)khr, (N)khy	phy
dʒ ²	(C)Cj, (C)Cgy	
ndʒ ²	Nj, Ngr, Ngy, fiby	
tʂ ²	dr, br	gr, spr
tʂ ^h	(f)phr	(N)khr
dʒ ²		Cbr, Cgr
ndʒ ²	fibr, Ndr	figr

k ¹	(C)Ck	
k ²	g	
k ^h	(N)kh	
g ²	(C)Cg	
ŋg ²	Ng	rg
m ¹	Cm	
m ²	m	
n ¹	Cn	
n ²	n	
j ¹	Cny, Cm(y)e, Cm(y)i	
j ²	ny	n, ng / _as (perhaps inherited)
ŋ ¹	Cng	
ŋ ²	ng	
s ¹	Cs	sl, sr
s ²	z	
s ^h	s	sl
z ²	Cz	
ɕ ¹	(C)Ckr, (C)Ckry, Cpy,	Csh
ɕ ²	by	Czh, spy
ɕ ^h	(f)phy	sh
ʐ ²	sby	by, Czh
ʂ ¹	sr, spr	Csh
ʂ ²		Czh
ʂ ^h	hr	s(Vr)
ʐ ¹	sbr, sgr	
x ¹	Csh	dp
x ²	zh	
x ^h	sh	Csh
ɣ ²	Czh	sby
r ²	r	
l ¹	bl, kl, gl, rl	sl
l	l	
ɭ	lh	
j ¹	g.y, dby	
j ²	y	fi
w ¹	?	
w ²	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 than 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 *h̥-, except spr- and sbr- which change to *sr and *zr.

OT dentals	OT alveolo-palatal	OT stop+y/r clusters	other
*s > *s ^h	*ç > *ç ^h		*spr > *sr
*Cs > *hs ¹	*Cç > *hç ¹	*Ck > *hk, *Cp > hp	
*z > *z ²	*ç̣ > *ç ²	*g > *k ² , *b > p ²	
*Cz > *ḥz ²	*Cç̣ > *ḥz ²	*Cg > *hg ² , *Cb > *hb ²	*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
*s ^h	*ç ^h > *ç̣ ^h	*(m)p ^h j > ç ^h
*hs ¹	*hç ¹ > *ḥç ¹	*hkr ¹ , *hkj ¹ , *hpj ¹ > *hç ¹
*s ²	*ç ² > *ç̣ ²	*pj ² > *ç ²
*ḥz ²	*ḥç̣ ² > ḥz ²	*hḅj ² > *ḥz ²

C. Loss of the preinitials

OT dentals	OT alveolo-palatal	OT stop+y/r clusters
*s ^h	*ç̣ ^h	*ç ^h
*s ¹	*ç̣ ¹	*ç
*s ²	*ç̣ ²	*ç ²
*z ²	*ç̣ ²	*ç̣ ²

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
s ^h	*ç̣ ^h > x ^h	ç ^h	*r̥ > ç ^h
s ¹	*ç̣ ¹ > x ¹	ç ¹	*sr > ç ¹
s ²	*ç̣ ² > x ²	ç ²	
z ²	*ç̣ ² > ʁ ²	ç̣ ²	*zr > ẓ

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	o:	a:n, e:	a:, o:, a:ŋ	ə:, e:, ə	e:, i:, a:	ə:, e:
e	e		e			e:n			i	e:
i	i, ə					ə:n	ə:			i:
o	o, u, e			o		o:n, a:n	u:, o:, o:ŋ	o:		e:, i:
u	u	o, u		u		i:n	u:, o:ŋ	ə	u, i, u:	u:

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

- OT –u did not centralize and merge with –i (stage 7)
- The chain shift o > u, u > u (stage 8) did not occur.
- r was long in most words (though Qu mentions some final –r are preserved in the literary layer)
- 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.
- 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 du:², Lcangtshal du:². However, exceptions are more common. For instance, ‘go.IMP’ <song> is s^hu:² in Nyinpa and so:ŋ² 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 dzua:ŋ¹ ‘intestine’ <rgyu.ma> corresponding to Nyinpa dzə²wā:¹ would be difficult to interpret if Lcang-tshal has preserved the OT final –ŋ.

For initial consonants, the main differences are the following :

- OT prenasalized voiced stops always lose the prenasalization in Lcang-tshal Cone, for instance <fibu> ‘worm’ becomes bu² (Nyinpa mbə²).
- 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 zu² (Nyinpa ndæ²γə¹ <mda.gzhu>).
- Non-prefixed fricatives do not become aspirated. OT <so> ‘tooth’ becomes

Lcangtshal so¹ (Nyinpa s^ho¹).

In other words, the separation of Nyinpa and Lcangtshal occurred 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 tʂ^ha³⁵p^hie⁵³ 'yeast to make wine' <chang.phabs> but as p^hei³⁵ 'yeast' <phabs>.

For the rhymes, the correspondences are the following:

	o	b	d	g	m	n	ŋ	r	l	s
a	a/ə	ie, ei, ei, e	i,ei, ε, ə	a	ou, un, oŋ	e, ε	a, oŋ	a, ei, ε, ə	ei, ie	ei, ε, e, a
e	e, i, ei, i	i	i, e	a	i, ei, əŋ	ən	i	i, ei, a	i, ei	ie, i
i	i	u	i	i, (ai)	ən, i, in	i	i, əŋ	i	i	i
o	o, ou, ʊ	o, e	i	u, ou, ʊ	un, oŋ, u	i, un, ou, əŋ	u, ʊ, o	ʊ, o, i, ʰ	u, ou, ʊ, i, o	i, ou
u	ʊ, u, ou	o, u, i	i	ʊ, u	un	i, u	u, un	u, əŋ	i, əŋ, 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:

- OT –i and –u (as in Qu's dialect) do not centralize (stage 7)
- OT –r is not preserved.
- Rhymes with final –n seem to lose nasality in most cases.
- In a few examples, rhymes with final –s are not fronted.
- 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 transcribed 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 A³⁵ʂ^ha³¹. 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^ha³⁵, a form identical to Nyinpa Cone. The clusters gzh- and bzh- correspond to r- in Yang’s transcription, as in ‘four’ <bzhi> ri³⁵.

The clusters spr- and sbr- correspond to the affricates tʂ- and dz- as in ‘cloud’ <sprin> tʂi⁵³, compare Nyinpa ʂi¹. It is interesting to note that the word ‘thick’, classical <sbom>, appears as dzun³⁵ in this dialect¹², which suggests a proto-Cone *sbrom like Nyinpa Cone zō¹.

A few other irregularities similar to Nyinpa Cone include ‘Xanthoxylum’ <g.yer.ma> ʒa³⁵mə⁵³ with an open vowel (Nyinpa jær¹mæ¹ instead of expected *jer¹mæ¹) and ‘open’ <ñbyed> ɕin³⁵ with irregular nasality is reminiscent of Nyinpa forms ndzær²/ɕher¹ ‘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, a:	aŋ	an, ɛ	a, a:, 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.

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 \grave{V} on the vowel.

In this section, we will study four cases, which illustrate all the attested alternations: Genitive (fibrel.sgra, in Old Tibetan $-gi$, $-gyi$, $-kyi$, $-yi$ or $-hi$ 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 $-\text{æ}$, $-\text{ɛ}$, $-\text{ɔ}$ and $-\text{ə}$, 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	tæ ¹	te ¹	te: ¹	te ¹	tæ ¹ ræ̀
goat	ra	ræ ²	re ²	re: ²	re ²	ræ ² ræ̀
parrot	ne.tso	nɛ ² tso ¹	nɛ ² tsu ¹	nɛ ² tsɪ: ¹	nɛ ² tso ¹	nɛ ² tso ¹ ræ̀
demon	fidre	ndzɛ ²	ndzɪ ²	ndzɪ: ²	ndzɛ ²	ndzɛ ² ræ̀
fire	*Cmye	jɛ ¹	jɪ ¹	jɪ: ¹	jɛ ¹	jɛ ¹ ræ̀
bug	fibu	mbə ²	mbɯ ²	mbi: ²	mbo ²	mbə ² ræ̀
man	*Cmyi	jə ¹	jɯ ¹	ji: ¹	jo ¹	jə ¹ ræ̀

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

Absolutive	Genitive	Ergative	Dative
-æ	-e	-e:	-e
-ɔ	-u	-ɪ:	-o
-ɛ	-ɪ	-ɪ:	-e
-ə	-ʉ	-i:	-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	e:	as
ɛ	e	ɪ:	es
ɔ	o	ɪ:	os
ə	i	i:	is
ə	u	i:	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 –ɪ 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	*εʔ	*εʔ	e
ε	e	ɪ	*eʔ	*εʔ	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 *εʔ > *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 *εʔ 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 *-εʔ and subsequent vowel harmony: all vowels shifted to their corresponding mid-low counterpart. This had no influence on the genitive form *εʔ 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 k^hæ²wæ¹ ‘house’ (from <khang.ba> with irregular vocalism) or ts^hə²wæ¹ ‘household’ have a genitive form in –u: k^hæ²wu¹, ts^hə²wu¹ instead of expected *k^hæ²we¹, *ts^hə²we¹. The ergative and dative are regular (k^hæ²we¹, k^hæ²we¹ respectively). Second, the first and second person singular pronouns, whose paradigms are presented in the following table:

OT	Absolutive	Genitive	Ergative	Dative
nga	ŋæ ²	ŋə ²	ŋe:	ŋã: ²
khyod	tɕ ^h ɔ ¹	tɕ ^h ʉ ¹	tɕ ^h ɪ: ²	tɕ ^h o ¹

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 a e i ɪ u ʉ, that all have long counterparts.

The attested alternations are illustrated by the following examples. Despite 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	tɑ ¹	tæ ¹ qɑ̀	tæ ¹ ɣè	tæ ¹ χtæ
needle	khab	k ^h e ¹	k ^h ε ² kkà	k ^h ε ² ɣè	k ^h ε ² ttæ
Tibetan	bod	pɪ ²	pε ² kkà	pε ² ɣè	pε ² ttæ
louse	shig	x ^h i ¹	x ^h ə ² kkà	x ^h ə ² ɣè	x ^h ə ² ttæ
people	dmangs.tshogs	mã: ² ts ^h u ¹	mã: ² ts ^h ɔ ¹ qɑ̀	mã: ² ts ^h ɔ ¹ ɣè	mã: ² ts ^h ɔ ¹ χtæ
sheep	lug	lɯ ²	lə ² kkà	lə ² ɣè	lə ² ttæ

These alternations can be analyzed as follows:

Absolutive	Genitive/ Ergative	underlying form	Dative	underlying form	Comitative	underlying form
ɑ	æqɑ̀	/æk.Gə/	æɣe	/æk.ə/	æχtæ	/æk.Dæ/
e	εkkà	/εC.Gə/	εɣe	/εC.e/	εttæ	/εC.Dæ/
ɪ	εkkà	/εC.Gə/	εɣe	/εC.e/	εttæ	/εC.Dæ/
i	əkkà	/əC.Gə/	əɣe	/əC.e/	əttæ	/əC.Dæ/
u	ɔqɑ̀	/ɔk.Gə/	ɔɣe	/ɔk.e/	ɔχtæ	/ɔk.Dæ/
ʉ	əkkà	/əC.Gə/	əɣe	/əC.e/	əttæ	/əC.Dæ/

In all oblique cases, the regular conjunct form of the short vowels emerge. The surface [ɣ] and [χ] 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 /zə²kkà/ 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	tær ²	tær ² kà	tær ² rè	tær ² tæ
gser	gser	ser ¹	ser ¹ kà	se ¹ rè	ser ¹ tæ

/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	ʃã: ¹	ʃæ ¹ ŋgə̀	ʃæ ¹ nè	ʃæ ¹ ndæ̀
bear	dom	tõ: ²	tɔ ² ŋgə̀	tɔ ² nè	tɔ ² ndæ̀
teacher	dge.rgan	ge: ² gẽ: ²	ge: ² gɛ ² ŋgə̀	ge: ² gɛ ² nè	ge: ² gɛ ² ndæ̀
tree	shing	x ^h ĩ: ²	x ^h ə ² ŋgə̀	x ^h ə ² nè	x ^h ə ² ndæ̀

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
ã:	æŋgə̀	/æN.Gə/	æne	/æN.e/	ændæ̀	/æN.Dæ/
õ:	ɔŋgə̀	/ɔN.Gə/	ɔne	/ɔN.e/	ɔndæ̀	/ɔN.Dæ/
ẽ:	ɛŋgə̀	/ɛN.Gə/	ɛne	/ɛN.e/	ɛndæ̀	/ɛN.Dæ/
ĩ:	əŋgə̀	/əN.Gə/	əne	/əN.e/	əndæ̀	/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’ <rɲag> and nã² ‘forest’ <nags> are not treated as nasal stems, their oblique forms follow the declension of a –a short vowel stem.

The noun nã:² ‘inside’ <nang> has no conjunct form, and its oblique forms are similar to a long vowel stem nã:²ɣə̀, nã:²ŋè, nã:²ræ̀. This strongly supports the idea that nasalization is secondary in this noun; it is an inherited form whose regular reflex should have been *nã:² 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	x ^h ɑ: ²	x ^h ɑ: ² ɣə̀	x ^h ɑ: ² ŋè	x ^h ɑ: ² ræ̀
rabbit	ri.bong	rə ² ɣu: ²	rə ² ɣu: ² ɣə̀	rə ² ɣu: ² ŋè	rə ² ɣu: ² ræ̀
monkey	spreɦu	ʃi: ¹	ʃi: ¹ ɣə̀	ʃi: ¹ ŋè	x ^h ɑ: ² ræ̀

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 –u: coming from a suffix –bo/-po in OT have alternative ergative and dative forms similar to plain vowel stem. For instance, dzæ²ru:² ‘king’ <rgyal.po> has two possible dative forms dzæ²ru:²ŋè or dzæ²ro²; pa:¹wu:¹ ‘beggar’ has pa:¹wi:¹ in the ergative and pa:¹wo¹ in the dative. The genitive and comitative forms of these

nouns is regular (pa:¹wu:¹ɣə̀ and pa:¹wu:¹rə̀). This is also true of the plural suffix –tɕʰu: (genitive –tɕʰɪ:, 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* (hdas.pa), *future* (ma.fhong.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 categories 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	e:	ɪ:	3	tæ¹, te:¹, tɪ:¹	lta, bltas, ltos	see
2	ɔ	ɪ:	ɪ:	5	kɔ¹, kɪ:¹	rko, brkos	dig
3	ɛ	ɪ:	ɪ:	3	dʒɛ¹, dʒɪ:¹	rje, brjes	change
4	ə	i:	i:	13	ɕə¹, ɕi:¹	skyi, bskyis	borrow
5	æ	ɪ:	ɔ	1	sæ², sɪ:², sɔ²	za, zos, zo	eat
6	ɑ	ɑ	u	7	ndʒɑ², tʃɑ², tʃu²	fɪbreg, bregs	cut, mow
7	u	ɑ	u	3	ndʒu², ɣɑ², ɣu²	fɪjog, bʒhag, ʒhog	put
8	i	e:	i:	1	ɕi², ɕe:², ɕi:²	byed, byas, byos	do
9	ɪ	ɪ:	ɪ:	1	gɪ², gɪ:²	bgod, bgos	share
10	ã:	ã:	õ:	3	dã:², dõ:²	bsdams, sdoms	tie
11	ã:	ã:	ũ:	1	nã:², nũ:²	nyal, nyol	sleep
12	ẽ:	ɑ:	u:	3	lẽ:², la:¹, lu:¹	len, blangs, longs	pick up
13	ĩ:	ɸ:	ɸ:	1	ndʒĩ:², zɸ:²	fɪdzin, bʒung	hold
14	ɑ:	ɑ:	u:	9	mbɑ:², pa:², pu:²	fɪbal, bal	pluck out
15	ær	ær	or	4	ɲgær², kær¹, kor¹	dgar, bkar	chop

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

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, ε, 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	e:	as	i:	os
2	ɔ	o	i:	os	i:	os
3	ε	e	i:	es	i:	es
4	ə	u, i	i:	us, is	i:	us, is

The Cone alternations here faithfully reflect the OT paradigms. The verb ‘to eat’ present a unique alternation: PR *sæ*², PS *sɪ*², IMP *sɔ*². 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	tɑɑ ¹ , tæ ¹ qqə ¹	bcag	break
e	ɛkkə	se ¹ , sɛ ¹ kkə ¹	bsad	kill
ɪ	ɛkkə	tɪ ¹ , tɛ ¹ kkə ¹	lteb	fold
i	əkkə	tsi ¹ , tsə ¹ kkə ¹	rtsig	lay bricks
u	ɔqqə	ndzɹu ² , ndzɔ ² qqə ¹	ɸjog	put
ʉ	əkkə	gʉ ² , gə ² kkə ¹	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	?	e:	as	i:	?
9	ɪ	od	i:	os	i:	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 –a in Cone, this distinction is lost for –g final verbs (for instance OT <ɸbreg> ‘cut’ regularly becomes ndza², indistinguishable from a protoform *ɸbrag). 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). There is one type 6 verb with –e in the past tense instead of –a : the auxiliary dza² <rgyag>, past dze² <rgyab>. This irregular vowel alternation directly reflects an OT final stop alternation.

The expected paradigms of the verbs tse¹ ‘cut off’ <gtsab>, tce¹ ‘cut’ <bcad> and the a/e ablaut verb ‘to fold’ tɪ¹ <lteb> should be:

meaning	PR	PS	IMP
cut off	gtsab	btsabs	gtsobs
	tse ¹	tse ¹	*tsu ¹
cut	gcod	bcad	chod
	*tɕɪ ¹	tce ¹	*tɕ ^h ɪ ¹
fold	lteb	bltabs	ltobs
	tɪ ¹	*te ¹	*tu ¹

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 gr² ‘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 gr², grɪ².

On the other hand, the verb ‘do’ presents irregular correspondences with OT. The past ɕe:2 can be accounted for with the OT past stem <byas>, but the present ɕi² and imperative ɕi:2 are unexplained: <byed> and <byos> should have become *ɕi² and *ɕi:2. Since the contrast between /i/ and /i:/ 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 dissipate this doubt: had the present stem been *ɕi², 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
	*ɕɪ ²	ɕe:2	*ɕi:2
do 2	bgyid	bgyis	gyis
	*dʒi ²	dʒi:2	ɕi:2

The correspondence of OT gy- to Cone ɛ- 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 ɛi:² 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 ɛi:², however, resembles neither the present *ɛi:² <byed> nor *dzi:² <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 *fgyid with a nasal prefix. An alternative possibility is that this stem is a blend of the two forms *ɛi:² and *dzi:², 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
ã:	æŋgə	dã: ² , dæ ² ŋgə ¹	bsdams	tie
ẽ:	ɛŋgə	ndẽ: ² , ndɛ ² ŋgə ¹	fɪdon	read
õ:	ɔŋgə	k ^h õ: ² , k ^h ɔ ² ŋgə ¹	khom	have free time
ĩ:	əŋgə	ɣĩ: ² , ɣə ² ŋgə ¹	sbyin	give

The verb jã:² ‘sleep’ <nyal> has no special conjunct form, and appears as jã:²ɣə¹ with the present suffix. The adjectives mã:² ‘many’ <mang> and tʂã:² ‘straight’ <drang> have present forms without nasality mɑ:²ɣə¹ and tʂɑ:²ɣə¹. In these three irregular forms, nasality is clearly a secondary feature.

Long vowel stems have no distinct conjunct form with the present suffix, as in kɑ:¹ ‘fill up’ <skang>, present kɑ:¹ɣə¹.

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	ã:	am	ã:	ams	õ:	oms
11	ã:	al	ã:	al	ũ:	ol
12	ẽ:	en(d)	ɑ:	ang	u:	ongs
13	ĩ:	in(d)	ɰ:	ung	ɰ:	ungs
14	ɑ:	ang/al	ɑ:	angs/al	u:	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)
	ẽ:	an	ẽ:	an	ẽ:	on

e: as e: as I: OS

In the case of OT –an stems, give the fact that OT –an and –on merge as –ẽ: in Cone, sound change alone makes these verb become invariable. For –as stems, we would expect a –e: / –i: 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	æ̃r	ar	æ̃r	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	p ²	p ²	mba:², pa:², pu:²	fibal, bal, bol	pluck out
2	ndẓ	tʂ²	tʂ²	ndẓə², tʂi:²	fɪdri, bris	write
3	ŋg	k²	k²	ŋge², ke²	gad	blossom
4	mb	p¹	p¹	mbu², pu¹	fɪbigʂ, phug	drill
5	nd	t¹	t¹	ndu², ta¹, tu¹	fɪdog, btags	hang
6	ndz	ts¹	ts¹	ndzu², tsu¹	fɪdzugs, btsugs	insert
7	ndʒ	tɕ¹	tɕ¹	ndzu², tɕa¹, tɕu¹	fɪgyog, bkyags	raise
8	ŋg	k¹	k¹	ŋge², ke¹	fɪgebs, bkab	cover
9	ndz	z	z	ndzĩ:², zu:²	fɪdzin, bzung	hold
10	ndʒ	ɕʰ	ɕʰ	ndzer², ɕʰer¹	fɪbyed, phye	open
11	ndʒ	ɣ	ɣ	ndzu², ɣa², ɣu²	fɪjog, bzhag, zhog	put
12	tʰ	t	t	tʰor¹, tor¹	gtor	separate
13	tsʰ	ts	ts	tsʰẽ:², tsẽ:¹	fɪtshem, btsems	sew
14	tɕʰ	tɕ	tɕ	tɕʰi¹, tɕi:¹	fɪkhrud, bkruʂ	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 unprefixes stops became voiceless stops in Cone, regular phonetic laws yield the following alternations :

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP (Cone)	(OT)
mb ²	ḥb	p ²	b	p ²	b
nd ²	ḥd	t ²	d	t ²	d
ndz _ḥ ²	ḥdr/ḥbr	tṣ ²	dr/br	tṣ ²	dr/br
ḥg ²	ḥg	k ²	g	k ²	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 ndz_ḥ² / tṣ² alternation has several distinct origins. As in many Tibetan languages, dr- and br- merge as tṣ² in Cone, so that three conjugations merge into one:

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP (Cone)	(OT)
br stem	ndz _ḥ ²	ḥbr	tṣ ²	br	tṣ ²	br
dr stem	ndz _ḥ ²	ḥdr	tṣ ²	dr	tṣ ²	dr
r stem	ndz _ḥ ²	ḥdr	tṣ ²	br	tṣ ²	r

r-stem verbs have been discovered by Hill (2005), who pointed out that the real OT paradigm of ‘write’ was *ḥdri*, *bris*, *bri*, *ris*. Jacques (2010b) showed that a few other verbs presented the same alternations, in particular ‘cut’ *ḥbreg*, *bregs* more properly spelled *ḥdreg*. 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 ndz_ḥ² of the verbs ‘ask’ ndzṣ² <ḥdri> and ‘cut’ ndzṣ² <ḥdreg> comes from the origin OT form or from a analogized form <ḥbri> / <ḥbreg>, the imperative of those verbs has been remodeled as tṣ² 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 ḥ- 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	ḥgebs	bkab	dgab	khob
take out	ḥdon	bton	gdon	thon
insert	ḥdebs	btob	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)
mb ²	ɦb	p ^h	ph	p ^h	ph
nd ²	ɦd	t ¹	bt	t ^h	th
ndz ²	ɦdz	ts ¹	bts	ts ^h	tsh
ndz̥ ²	ɦj	tɕ ¹	bc	tɕ ^h	ch
ndz̥ ²	ɦgy	ɕ ¹	bky	tɕ ^h	khy
ŋg ²	ɦg	k ¹	bk	k ^h	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	mb ²	ɦb	p ¹	ph	p ¹	ph
5	nd ²	ɦd	t ¹	bt	t ¹	th
6	ndz ²	ɦdz	ts ¹	bts	ts ¹	tsh
7	ndz̥ ²	ɦj	tɕ ¹	bc	tɕ ¹	ch
8	ŋg ²	ɦg	k ¹	bk	k ¹	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 *thogs*, we should have in Cone past tɑ¹ (the attested form) and imperative *t^hu¹. 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	ɦbigʂ	phug < *pug < *b-pug	phug
expected Cone	*mbi ²	*p ^h u ¹	*p ^h u ¹
attested Cone	mbu ²	p ^h u ¹	p ^h u ¹

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	ndzu ²	*ɕɑ ¹	*tɕ ^h u ¹
attested Cone	ndzu ²	tɕɑ ¹	tɕu ¹

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 <* bɗzuŋ	gzung <*gɗzuŋ	zung <*ɗzuŋ
put	ɦjog	bzhag <*bɗzak	gzhag <*gɗzak	zhog <*ɗzak-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 affricates¹³ 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	*dza ² (Bradley 1979)
bridge	zam <*ɗzam	ndzom <*ndzam	*ɗzam ¹
dew	zil <*ɗzil		*ʔ-dzi ² (Matisoff 2003:187)
burning smell	gzhob <*kɗzop	ɣndzɿβ <*kndzɿp 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	ndz ²	z ²	s ²
attested Cone	ndz ²	z ²	z ²
OT	ɦj	bzh	zh
expected Cone	ndz ²	ɣ ²	x ²
attested Cone	ndz ²	ɣ ²	ɣ ²

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	ndz-	ɕ ^h	ɕ ^h

This is exactly the paradigm observed for the verb ‘open’, in OT *ɦbyed*, *phye*, *phyes*, Cone ndzɿr², ɕ^her¹, ɕ^her¹. 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 ndzɿβ ‘to burn’, the anticausative of tɕɿβ <*tɕɿp ‘burn tr.’

The regular evolution from OT should be:

PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
t ^h	ɦtʰ	t ¹	bt	t ^h	th
ts ^h	ɦtʰʃ	ts ¹	bts	ts ^h	tʃh
tɕ ^h	ɦtʃ	tɕ ¹	bc	tɕ ^h	ch
tɕ ^h	ɦkhy, ɦkhr	ɕ ¹	bky, bkr	tɕ ^h	khy, khr
k ^h	ɦkh	k ¹	bk	k ^h	kh

The attested forms are :

	PR (Cone)	(OT)	PS(Cone)	(OT)	IMP(Cone)	(OT)
12	t ^h	ɦtʰʃ	t ¹	bts	t ¹	tʃh
13	ts ^h	ɦtʃ, ɦkhy, ɦkhr	ts ¹	bc, bky, bkr	ts ¹	ch, khy, khr
14	tɕ ^h	ɦkh	tɕ ¹	bk	tɕ ¹	kh

Here again, the imperative forms have been entirely renewed. The expected tɕ^h- / 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	tɕ ^h i ¹	ɕi ¹	tɕ ^h i ²
attested Cone	tɕ ^h i ¹	tɕi ¹	tɕi ¹

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)
ndɯ ²	ɦdug	de ²	bsdad	di ²	sdod
jɯ ²	yong	pi ²	bud	x ^h u ¹	shog
ndzɔ ²	ɦgro	s ^h u ²	song	s ^h u ²	song

The patterns of suppletion observed in these verb are quite common across Tibetan languages, especially 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:

/dze:²/ ‘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 hgyur-zhing zhag bdun gyis fchi-ho /
 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.

/tʰɔ²re:²/ ‘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 Zhonggu and some Amdo dialects such as Hongyuan (Sun 2003:836), but not in Baima.

/tʂʰa²ŋgɔ¹/ ‘shoulder’. This word goes back to an unattested compound *phrag.mgo, literally ‘the head of the shoulder’.

/næ²χtɕa¹/ ‘wife’. Reconstructed back to OT, this word would be *nag.chags, a colorful *bahuvrīhi* whose literal meaning is ‘the one who has dark desires’. Compare the term <nag.mo> ‘the black one’ for ‘woman’ in CT.

/sa:²ŋgɔ¹/ ‘bald person’. The corresponding OT form would be *zangs.mgo, a *bahuvrīhi* meaning ‘the one whose head is (polished like) brass’.

/sə²mbə¹ ɲɛ¹ta¹/ ‘firefly’. A complex compound such as *srin.fibu.me.stag ‘demon bug, fire tiger’ must be reconstructed here.

/tɕ^hə²rɔ¹pʰæ²χtsa:¹/ ‘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’.

/mə²ndzɤ:¹wã:²/ ‘snail’. The syllable ndzɤ:² (with tonal alternation) clearly reflect the verb <fidzul> ‘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->, as it is not entirely clear how this compound is to be analyzed.

/kʰu:²/ ‘hurt (it)’. Two etymologies are possible for this verb, either <fikhong> ‘dislike’ or <fikhol> ‘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: $\text{j}\epsilon^1$ ‘fire’ <me> *Cmye, $\text{j}\alpha^1$ ‘man’ <mi> *Cmyi, ji^1 ‘swallow’ <mid> *Cmyid and ji^1 ‘name’ <ming> from *Cmying.N with a nasal suffix explaining the secondary nasalization.

/zõ:/ ‘thick’ comes from *sbrom, a -r- infix variant of standard <sbom>.

/mbu:²wã:¹/ ‘bee’ comes from *fibung.ma with a nasal prefix. The Classical form is <bung.ba>.

/ndzer², ɛʰer¹/ ‘open’ from *fbyer, *phyer rather than classical <fbyed, 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
$\text{t}\epsilon^2\text{p}^{\text{h}\text{o}^1}$	rooster	*de.pho
$\text{d}\text{z}\alpha^2\text{m}\alpha^1$	young girl	*rgy[ang,al].ma
$\text{x}\alpha^2\text{y}\text{i}^1$	child	*zh[ang,al].[b,g]zh[us,is,il,ing]
$\text{æ}^2\text{p}\alpha^1$	baby	*a.Cpo
zi^1	sweep	*s[b,g]r[us,is,il,ing]
zi^2	twist fibers to make a rope	*sby[us,is,il,ing]
$\text{p}\alpha^2$	crispy	*bur (perhaps related to <bu.ram> ‘sugarcane’)
$\text{d}\text{z}\alpha^2$	rafter	*[rj,sgy,rgy][ib,ug,ub]
$\text{d}\text{z}\alpha^2$	uterus (of animals)	*[rdz,zl][ang,al,a.ba]
$\text{d}\alpha^2$	thick (of liquids)	*[bd,sd]ur
$\text{d}\alpha^2\text{m}\text{m}\tilde{\alpha}^1$	broom	*[bd,sd]uC.ma
$\text{æ}^1\text{x}\text{i}^1$	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- > ʃ-, sbr- > z-	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.
VI, Vng > V: exclusive merger of –ub, –ib, –ug exclusive merger of –ab, –ad r-metathesis	Found in words such as ɲær ¹ <rnga> ‘drum’.

Since sound changes easily spread across 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.

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