Phonology of Qiang language

This appendix uses the following transliteration system:

p	*pʰ*	*b*	*m*	*f*	*w*	*v*	*t*	*tʰ*	*d*	*n*	*ɬ*	*l*	*r*	*k*
kʰ	*g*	*ŋ*	*x*	*γ*	*ć*	*ćʰ*	*ź*	*j*	*ç*	*ʑ*	*q*	*qʰ*	*q*	*ɦ*
x́	*ř*	*ś*	*śʰ*	*ź*	*s*	*z*	*ś*	*śʰ*	*ź*	*ṣ*	*ẓ*	*ś*	*śʰ*	*ź*
ṣ	*ẓ*	*u*	*ə*	*a*	*i*	*y*	*o*	*œ*	*e*	*q́*	*ŕ*	*ń*	*ħ*	*ł*

A.1 Phonology of Qugu Qiang

Qugu Qiang (羌语曲谷话) is the dialect of the standard phonology adopted in the Qiang written with Latin script. Rma script inherits some orthographic rules from Latin Qiang.

According to [LIU & SHANG, 2016], there are 42 single–consonant initials in Qugu Qiang. [HUANG & ZHOU, 2006] believes that, the phoneme /ŋ/ is not used as an initial, but only as a coda.

/m/	*m*	*mugw* /mugu̯/[1]
/n/	*n*	*na* /na/
/ɲ/[2]	*ni*	*niuqu* /ɲuqu/
	n	*ni* /ɲi/
/ŋ/	*ŋ*	*ŋu* /ŋu/
/p/	*p*	*pu* /pu/
/pʰ/	*pʰ*	*pʰu* /pʰu/
/b/	*b*	*bu* /bu/
/t/	*t*	*tu* /tu/
/tʰ/	*tʰ*	*tʰə* /tʰə/
/d/	*d*	*də* /də/
/k/	*k*	*ku* /ku/
/kʰ/	*kʰ*	*kʰo* /kʰo/
/g/	*g*	*gufa* /gufa/
/q/	*q*	*qu* /qu/
/qʰ/	*qʰ*	*qʰu* /qʰu/
/t͡s/	*ś*	*śu* /t͡su/
/t͡sʰ/	*śʰ*	*śʰu* /t͡sʰu/
/d͡z/	*ź*	*źu* /d͡zu/
/s/	*s*	*su* /su/
/z/	*ẓ*	*zu* /zu/
/t͡ʂ/	*ś*	*śu* /t͡ʂu/
/t͡ʂʰ/	*śʰ*	*śʰə* /t͡ʂʰə/
/d͡ʐ/	*ź*	*źu* /d͡ʐu/
/ʂ/	*ṣ*	*ṣu* /ʂu/
/ʐ/	*ẓ*	*biẓi* /biẓi/
/t͡ɕ/	*ć*	*ći* /t͡ɕi/
/t͡ɕʰ/	*ćʰ*	*ćʰi* /t͡ɕʰi/
/d͡ʑ/	*ź*	*źi* /d͡ʑi/
/ɕ/	*ç*	*çop* /çop/
/ʑ/	*ź*	*biźi* /biźi/
/f/	*f*	*dəfe* /dəfe/
/x/	*x*	*xe* /xe/
/ɣ/	*γ*	*γəɣuŕ* /ɣəɣuɻ/
/χ/	*x́*	*bax́a* /baχa/
/ʁ/	*ř*	*řo* /ʁo/
/h/[3]	*x*	*xala* /hala/
/ɦ/	*ɦ*	*ɦiele* /ɦiele/
/w/	*w*	*q́wa* /awa/[4]
/j/	*j*	*ji* /ji/
/ɬ/	*ɬ*	*ɬi* /ɬi/
/l/	*l*	*lu* /lu/
/ʎ/	*r*	*oru* /oʎu/

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[1] Same as Qiang in Latin, devoiced /u̯/ is written as *w*, other devoiced phonemes keep the same.

[2] The phoneme /ɲ/ before /i/, /y/, and /j/ is written as *n*, otherwise it is written as *ni*.

[3] The phonemic /h/ is always written as *x* in Qugu Qiang.

[4] When words have /a/ as the first syllable, the corresponding *q́a* can be abbreviated as *q́*.

According to [LIU & SHANG, 2016], there are 49 multi–consonant initials in Qugu Qiang, all of which are double–consonant. According to [HUANG & ZHOU, 2006], there are 35 long–consonant initials and 46 multi–consonant initials in Qugu Qiang, all of which are double–consonant. In Rma script, letters corresponding to multi–consonant initials are written from left to right. In particular, long–consonant initials (i.e. double–consonant initials with same consonant) are written as two aspirated consonants in the Rma script, even though only the latter consonant is marked aspirated in IPA (because the aspirated part of the aspirated long consonants occurs only in the releasing phase).

/ʂm/	ɑ̀ɭʘ ʂm	ɡ̀ɑɭʘ q̇eʂme /eʂme/		/t͡ɕt͡ɕʰ/	ꭲ̄ꭲꭲ	ɕʰɕʰ	ꭣꭲꭲꭲꭲ ɕʰyɕʰɕʰyi
/ʐd͡ʐ/	ꭲ̀ꭥ ʐʑ́	ꭲ̀ꭥꭲ ʐʑ́i /ʐd͡ʑi/					/t͡ɕʰyt͡ɕt͡ɕʰyi/
/ɣd͡ʐ/	ꭥꭥꭲ ɣʑ́	ꭥꭥꭲꭲ ɣʑ́ə /ɣd͡ʐə/		/kkʰ/	ꭨꭨ kʰkʰ	ꭲꭲꭨꭨꭲꭥ kʰuŕkʰkʰuŕ
/χɬ/	<ꭡꭲ χɬ	<ꭡꭲꭲꭣ χɬupu /χɬupu/					/kʰuˑkkʰuˑ/
/ppʰ/	ьь pʰpʰ	ьⴑьь pʰupʰpʰa /pʰuppʰa/		/qqʰ/	ɢɢ qʰqʰ	ꭲꭐꭐꭲ qʰəqʰqʰa /qʰəqqʰa/

According to [LIU & SHANG, 2016], there are 32 single–vowel finals in Qugu Qiang (from /i/ to /æˑ/). [HUANG & ZHOU, 2006] mentions another 6 finals (from /ỹ/ to /ɚ/). In the table below, the finals will be shown with *m* as the initial.

/i/	ꭲ *i*	ꭥꭲ *mi* /mi/		/oˑ/	ꭘꭲ *oˑ*	ꭥꭘꭲ *moˑ* /moˑ/
/y/	ꭲꭲ *y*	ꭥꭲꭲ *my* /my/		/uˑ/	ꭐꭲ *q̇uˑ*	ꭥꭲꭲ *muˑ* /muˑ/
/e/	ɡ̀ *q̇e*	ꭦ *me* /me/		/ɚ/	ꭘꭲꭲ *q̇ɚ*	ꭥꭲꭲ *mɚ* /mɚ/
/æ/	ɡ̈ *q̇æ*	ꭦ̈ *mæ* /mæ/		/æˑ/	ɡ̈ꭘꭲ *q̇æɚ́*	ꭦ̈ꭘꭲ *mæɚ́* /mæˑ/
/a/	ɡ̇ *q̇a*	ꭦ̇ *ma* /ma/		/aˑ/	ɡ̇ꭘꭲ *q̇aɚ́*	ꭦ̇ꭘꭲ *maɚ́* /maˑ/
/o/	ꭘ *o*	ꭥꭘ *mo* /mo/		/uˑ/	ꭐꭲꭘꭲ *q̇uɚ́*	ꭥꭲꭘꭲ *muɚ́* /muˑ/
/u/	ꭐ *q̇u*	ꭥꭲ *mu* /mu/		/ĩ/	ꭲ̨ *iń*	ꭥꭲ̨ *miń* /mĩ/
/ə/	ꭑ *q̇ə*	ꭥꭑ *mə* /mə/		/ũ/	ꭐ̨ *q̇uń*	ꭥꭲ̨ *muń* /mũ/
/iˑ/	ꭲꭰ *iq́*	ꭥꭲꭰ *miq́* /miˑ/		/æ̃ˑ/	ɡ̨̈ꭲ *q̇œńŕ*	ꭦ̨̈ꭲ *mœńŕ* /mæ̃ˑ/
/yˑ/	ꭲꭲꭰ *yq́*	ꭥꭲꭲꭰ *myq́* /myˑ/		/ã̃ˑ/	ɡ̨̇ꭲ *q̇ańŕ*	ꭦ̨̇ꭲ *mańŕ* /mã̃ˑ/
/eˑ/	ɡ̀ꭰ *q̇eq́*	ꭦꭰ *meq́* /meˑ/		/ũˑ/	ꭐ̨ꭲ *q̇uńŕ*	ꭥꭲ̨ꭲ *muńŕ* /mũˑ/
/æˑ/	ɡ̈ꭰ *q̇œq́*	ꭦ̈ꭰ *mœq́* /mæˑ/		/æ̃ˑ/	ɡ̨̈ꭲꭰ *q̇œńq́ŕ*	ꭦ̨̈ꭘꭲ *mœńq́ŕ* /mæ̃ˑ/
/aˑ/	ɡ̇ꭰ *q̇aq́*	ꭦ̇ꭰ *maq́* /maˑ/		/ỹ/	ꭧꭲꭲ *yń*	ꭧꭲꭲꭥ *ẽyńɕu* /fĩt͡ɕu/
/oˑ/	ꭘꭰ *oq́*	ꭥꭘꭰ *moq́* /moˑ/		/ę/	ɡ̀ *q̇e*	꭫ꭥ̨ꭲ *ẽæqele* /fĩæ-qęle/
/uˑ/	ꭐꭲꭰ *q̇uq́*	ꭥꭲꭰ *muq́* /muˑ/		/u̹/	ꭩ *w*	ꭥꭲьꭩ *mugw* /mugu̹/
/əˑ/	ꭑꭰ *q̇əq́*	ꭥꭑꭰ *məq́* /məˑ/		/ʐ̩/	ꭑ *q̇ə*	꭫ꭲꭲ *ẽaʂə* /fĩa-t͡ʂə/
/ɨˑ/	ꭲꭲ *iɚ́*	ꭥꭲꭲ *miɚ́* /miˑ/				
/eˑ/	ɡ̀ꭲ *q̇eɚ́*	ꭦꭲ *meɚ́* /meˑ/		/u̹ˑ/	ꭐꭲ *q̇uˑ*	꭮ꭲꭥꭲꭲꭲ *nəʂpaχuˑ*
/æˑ/	ɡ̈ꭲ *q̇œɚ́*	ꭦ̈ꭲ *mœɚ́* /mæˑ/					/nə-ʂpaχu̹ˑ/
/aˑ/	ɡ̇ꭲ *q̇aɚ́*	ꭦ̇ꭲ *maɚ́* /maˑ/		/ɚˑ/	ꭘꭲ *q̇ɚ*	꭫ꭘꭲ *ẽaχ́ɚ* /fĩa-χɚ/

According to [LIU & SHANG, 2016], there are 42 multi–vowel finals in Qugu Qiang (from /ie/ to /iau/). [HUANG & ZHOU, 2006] mentions another 22 multi–vowel finals (from /yæ/ to /uaɚ/).

/ie/	ꭲ̀ *ie*	ꭥꭲ̀ *mie* /mie/		/yɚ/	ꭲꭲꭲ *yɚ́*	ꭥꭲꭲꭲ *myɚ́* /myɚ/
/iæ/	ꭲ̈ *iœ*	ꭥꭲ̈ *miœ* /miæ/		/ui/	ꭐꭲ *q̇ui*	ꭥꭲꭲ *mui* /mui/
/iæˑ/	ꭲ̈ꭰ *iœq́*	ꭥꭲ̈ꭰ *miœq́* /miæˑ/		/uy/	ꭐꭲꭲ *q̇uy*	ꭥꭲꭲꭲ *muy* /muy/
/iæˑ/	ꭲ̈ꭲ *iœɚ́*	ꭥꭲ̈ꭲ *miœɚ́* /miæˑ/		/ue/	ꭐꭲ̀ *q̇ue*	ꭥꭲ̀ *mue* /mue/
/iæ̃ˑ/	ꭲ̈ꭲꭲ *iœɚ́*	ꭥꭲ̈ꭲꭲ *miœɚ́* /miæˑ/		/ũe/	ꭐꭲ̨ *q̇uńe*	ꭥꭲ̨ *muńe* /mũe/
/ia/	ꭲ *ia*	ꭥꭲ *mia* /mia/		/uæ/	ꭐꭲ̈ *q̇uœ*	ꭥꭲ̈ *muœ* /muæ/
/iaˑ/	ꭲꭰ *iaq́*	ꭥꭲꭰ *miaq́* /miaˑ/		/uæˑ/	ꭐꭲ̈ꭰ *q̇uœq́*	ꭥꭲ̈ꭰ *muœq́* /muæˑ/
/iaˑ/	ꭲꭲ *iaɚ́*	ꭥꭲꭲ *miaɚ́* /miaˑ/		/uæˑ/	ꭐꭲ̈ꭲ *q̇uœɚ́*	ꭥꭲ̈ꭲ *muœɚ́* /muæˑ/

IPA		Example	IPA		Example
/yi/	ɪɪ yi	myi /myi/	/uæː/	q́uœq́	muœq́ /muæː/
/ye/	ì ye	mye /mye/	/ua/	q́ua	mua /mua/
/yæ/	ï yœ	myœ /myæ/	/uaː/	q́uaq́	muaq́ /muaː/
/ya/	ı ya	mya /mya/	/ĩaː/	ińaq́	tixińaq́ /ti-hĩaː/
/uaˑ/	q́uaˑ	muaˑ /muaˑ/			
/uaˑː/	q́uaˑq́	muaˑq́ /muaː/	/ũi/	q́uńi	ɦuńi /ɦũi/
/uə/	q́uə	muə /muə/	/ũe/	q́uńe	ɦuńe /ɦũe/
/uɚ/	q́uəɚ	muəɚ /muɚ/	/ũa/	q́uńa	ɦuńa /ɦũa/
	q́úq́əɚ	muq́əɚ /muɚ/[5]	/ũaː/	q́uńaq́	ɦuńaq́ /ɦũaː/
/iɚ/	iq́əɚ	miq́əɚ /miɚ/	/eɚ/	q́eq́əɚ	śeq́əɚ /tʂeɚ/
/æɚ/	q́œq́əɚ	mœq́əɚ /mæɚ/	/eˑɚ/	q́eˑrq́əɚ	kʰeˑrq́əɚ /kʰeˑɚ/
/aɚ/	q́aq́əɚ	maq́əɚ /maɚ/	/ĩɚ/	ińq́əɚ	tixińq́əɚ /tihĩɚ/
/oɚ/	oq́əɚ	moq́əɚ /moɚ/			
/əɚ/	q́əq́əɚ	məq́əɚ /məɚ/	/aˑɚ/	q́aˑrq́əɚ	təwaˑrq́əɚ /tə-waˑɚ/
/iu/	iu	miu /miu/			
/ei/	q́ei	mei /mei/	/uˑɚ/	q́uˑrq́əɚ	qʰuˑrq́əɚ /qʰuˑɚ/
/æi/	q́œi	mœi /mæi/			
/ai/	q́ai	mai /mai/	/ũɚ/	q́uńq́əɚ	ɦuńq́əɚ /ɦũɚ/
/au/	q́au	mau /mau/	/əˑɚ/	q́əˑrq́əɚ	kʰəˑrq́əɚ /kʰəˑɚ/
/əu/	q́əu	məu /məu/	/yɚ/	yq́əɚ	ɕyq́əɚ /tɕyɚ/
/uæi/	q́uœi	muœi /muæi/	/ieɚ/	ieq́əɚ	pʰieq́əɚ /pʰieɚ/
/uai/	q́uai	muai /muai/	/iaɚ/	iaq́əɚ	miaq́əɚ /miaɚ/
/iau/	iau	miau /miau/	/ueɚ/	q́ueq́əɚ	kueq́əɚ /kueɚ/
/yæː/	ɕyœq́	ɕyœq́ /tɕyæː/	/uaɚ/	q́uaq́əɚ	xuaq́əɚ /χuaɚ/
/ĩe/	ińe	xińete /hĩete/	/ueˑɚ/	q́ueˑrq́əɚ	kʰueˑrq́əɚ
/ĩa/	ińa	šʰeɦińaq			/kʰueˑɚ/
		/tʂʰeɦĩaq/	/uaˑɚ/	q́uaˑrq́əɚ	
/ueˑ/	q́ueˑ	mueˑ /mueˑ/		daqʰqʰuaˑrq́əɚ /da-qqʰuaˑɚ/	

Note that when the syllable contains zero initial, *j* is added before single–vowel finals containing /i/ and /y/, and *w* before single–vowel finals containing /u/; *i* is replaced by *j* in multi–vowel finals and consonant–coda finals beginning with /i/, *q́u* is replaced by *w* in multi–vowel finals and consonant–coda finals beginning with /u/, and *j* is added before multi–vowel finals and consonant–coda finals beginning with /y/. If the zero–initial syllable begins with /i/ and /u/ is harmonically changed, the changes are not performed.

Since consonants as coda are all analyzed as base characters, consonants as coda do not introduce additional shaping issues, so no more finals with consonant coda will be listed.

A.2 Phonology of Luobozhai Qiang

Luobozhai Qiang (羌语萝卜寨话) is the dialect in which the Rma script is most widely used and has the most usage scenarios.

According to [Wang, 2017], there are 35 single–consonant initials in Luobozhai Qiang (羌语萝卜寨话). In addition, /w/ and /j/ are not phonemes, and are only used to indicate the beginning of the syllables. [Gao, 2018] removes /ɲ/, /ʐ/ and /ɦ/, and believes that /x/

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[5] When words come from morphological changes, /ɚ/ has a separate meaning, thus should be written as *q́əɚ*, otherwise it should be written as *əɚ*.

is not a phoneme, but an allophone of /χ/ in Han loanwords as. [Wang, 2017] also believes that [x] and [ɣ] are allophones of /χ/ and /ʁ/ in Han loanwords.

According to [Wang, 2017], there are 15 multi–consonant initials in Luobozhai Qiang, all of which are double–consonant initials. In Rma script, letters corresponding to multi–consonant initials are written from left to right.

/m/	ᔆ *m*	ᔆꔲ *muħ* /mu˥/		/s/	ꖬ *s*	ꖬꔲ *suħ* /su˥/
/n/	ꖏ *n*	ꖏꖰꔲ *nukuħ* /nu˥ku˥/		/z/	ꖠ *ẓ*	ꖠꔲ *ẓuħ* /zu˥/
/ɲ/	ꖏꖰ *ni*	ꖭꖏꖰ *guniu* /gu˥ɲu˥/		/t͡ʂ/	ꖬ *ś*	ꖬꖬ *śaśa* /t͡ʂa˥t͡ʂa˥/
	ꖏ *n*	ꖏꖰ *ni* /ɲi˥/		/t͡ʂʰ/	ꖬ *śʰ*	ꖬ *śʰa* /t͡ʂʰa˥/
/ŋ/	ꗐ *ŋ*	ꗐꔲ *ŋuħ* /ŋu˥/		/d͡ʐ/	ꖬ *ẓ́*	ꖬ *ẓ́a* /d͡ʐa˥/
/p/	ꖲ *p*	ꖲꔲ *puħ* /pu˥/		/ʂ/	ꖬ *ṣ*	ꖬꔲ *ṣuħ* /ʂu˥/
/pʰ/	ꖾ *pʰ*	ꖾꔲ *pʰuħ* /pʰu˥/		/ʐ/	ꖬꔲ *ẓ̣*	ꖬꔲ *ẓ̣uħ* /ʐu˥/
/b/	ꔀ *b*	ꔀꔲ *buħ* /bu˥/		/t͡ɕ/	ꖬ *ć*	ꖬꔲ *śaħću* /t͡ʂa˥t͡ɕu˥/
/t/	ꖰ *t*	ꖰ *ta* /ta˥/		/t͡ɕʰ/	ꖬ *ćʰ*	ꖬꔲ *ćʰyħ* /t͡ɕʰy˥/
/tʰ/	ꖰ *tʰ*	ꖰ *tʰa* /tʰa˥/		/d͡ʑ/	ꖬꔲ *ẓ́*	ꖬꔲ *ẓ́uħ* /d͡ʑu˥/
/d/	ꖪ *d*	ꖪ *da* /da˥/		/ɕ/	ꖬ *ɕ*	ꖬꔲ *ɕyħ* /ɕy˥/
/k/	ꖷ *k*	ꖷꖏꔲ *janka* /jan˥ka˥/		/ʑ/	ꖬ *ẓ̌*	ꖬꔲ *ẓ̌yħ* /ʑy˥/
/kʰ/	ꖷ *kʰ*	ꖷꔲ *kʰamiħ* /kʰa˥mi˥/		/f/	ꔲꖬ *f*	ꔲꖬ *faq́* /fa˩/
/g/	ꔀ *g*	ꔀꔲ *ẓaga* /za˥ga˥/		/χ/	ꖬꖬ *x́*	ꖬꖬꔲ *x́ux́uħ* /χu˥χu˥/
/q/	ꖷ *q*	ꖷ *qa* /qa˥/		/ʁ/	ꖬ *ř*	ꖬꔲ *řuħ* /ʁu˥/
/qʰ/	ꖷꖬ *qʰ*	ꖷꖬ *puqʰa* /pu˥qʰa˥/		/ɦ/	ꖬ *ɦ*	ꖬ *ɦuń* /ɦũ˥/
/ts/	ꖬ *ś*	ꖬꔲ *śuħ* /t͡su˥/		/w/	ꖬꖬ *w*	ꖬꖬ *wəħn* /wən˥/
/tsʰ/	ꖬ *śʰ*	ꖬꔲ *śʰuħ* /t͡sʰu˥/		/j/	ꖬ *j*	ꖬꖬ *jəu* /jəu˥/
/d͡z/	ꖬ *ẓ́*	ꖬꔲ *ẓ́uħ* /d͡zu˥/		/l/	ꖬ *l*	ꖬꔲ *luħ* /lu˥/

According to [Wang, 2017], there are 13 single–vowel finals in Luobozhai Qiang.

/i/	ꖰ *i*	ꖲꖰ *pi* /pi˩/		/eʴ/	ꖬ *q́eʴ*	ꖬ *meʴ* /meʴ˩/
/y/	ꖬ *y*	ꖬꖬ *ɦaẓy* /ɦa˩-zy˩/		/aʴ/	ꖬ *q́aʴ*	ꖬꖬꔲ *x́aʴṣpuħ* /χa˩ʂpu˥/
/e/	ꖬ *q́e*	ꖬ *pe* /pe˩/		/ɚ/	ꖬꖰ *q́əʴ*	ꖬꖰ *řəʴ* /ʁə˩/
/a/	ꖬ *q́a*	ꖬꖬ *řuaća* /ʁua˩t͡ɕa˩/		/ĩ/	ꖬꖰ *iń*	ꖬꖰꔲ *ẓ́iń̄ħ* /ʑĩ˥/
/o/	ꖬ *o*	ꖬ *poħ* /po˥/		/ã/	ꖬ *q́ań*	ꖬꖬ *pańla* /pã˩la˩/
/u/	ꖬ *q́u*	ꖬ *pu* /pu˩/		/ũ/	ꖬꖰ *q́uń*	ꖬꖰ *ɦuń* /ɦũ˩/
/ə/	ꖬ *q́ə*	ꖬꖬꖬ *ɦapəq́* /ɦa˩-pə˩/				

According to [Wang, 2017], there are 16 multi–vowel finals and 15 nasal–coda finals in Luobozhai Qiang. The finals will not be completely listed. For examples:

/io/	ꖰꖬ *io*	ꖬꖬꖬꖬ *səfioq́* /sə˩-fio˩/		/aŋ/	ꖬ *q́aŋ*	ꖬꖬꖬꖬ *śʰəhŋ́ćʰáŋ*
/əi/	ꖬꖰ *q́əi*	ꖬꖰ *məiq́* /məi˩/				/t͡ʂʰəŋ˥t͡ɕʰaŋ˥/
/iəu/	ꖬ *iəu*	ꖬꔲ *liəuħ* /liəu˥/		/uan/	ꖬꖬ *q́uan*	ꖬꖬ *ćʰuanṣuħ*
/in/	ꖰꖬ *in*	ꖰꖬ *ɕiħn* /ɕin˥/				/t͡ɕʰuan˩ʂu˥/
/iŋ/	ꖰꗐ *iŋ*	ꖬꖬꖬ *tiħŋśa* /tiŋ˥t͡sə˩/		/uaŋ/	ꖬꖬ *q́uaŋ*	ꖬꖬꖬ *x́uaħŋśʰoŋ*
/an/	ꖬꖬ *q́an*	ꖬꖬꖬ *pantiħ* /pan˩ti˩/				/χuaŋ˥t͡ʂʰoŋ˥/
/ian/	ꖰꖬ *ian*	ꖰꖬꖬ *pianpi* /pian˩pi˩/		/yan/	ꖰꖬ *yan*	ꖰꖬꖬ *ćyaq́n* /ɕyan˩/

According to [Wang, 2017], there are 4 tones in Luobozhai Qiang. The main tones are 55 and 31. The tone 55 corresponds to ħ (ᔆꔲ *muħ* /mu˥/), and the tone 31 corresponds to no grapheme (ᔆꖬ *mu* /mu˩/). When there are continuous syllables with tone 55, only the first syllable is labeled ħ, and all of the subsequent syllables are labeled nothing.

The tone 35 occurs in grammatically structured words and Han loanwords, and is marked with *ą́*, which precedes consonant coda (if consonant coda exists) or is in the end of the syllable (if consonant coda does not exist).

ⴰ̄ⴥꐇⴳ *qaħlamią́* /qa˥la˥-miˊ/

ⵍⴳꘇꑲ *ʐoą́maji* /ʐoˊ-maˎ-jiˎ/

ⵦⵏⴳꚋꙭ *ħaśʰoą́səi* /ħaˎ-tsʰoˊ-səiˎ/

ꕕⴳꛉꔲⴳⵡⵏⴳ *ćəuą́juanpuą́tuią́*

/tɕəuˊjuanˎpuˊtuiˊ/

ꕞꖠⴳ *pəćią́n* /pəˎtɕinˊ/

ꘇⴳꙸꗮⵏⵟ *waą́ńćaħći* /waŋˊtɕa˥-tɕiˎ/

The tone 51 occurs in Han loanwords or variant readings. The tone 51 in variant readings is labeled nothing, and are still written as the tones before the variation (i.e., tone 55); and the tone 51 in Han loanwords are written as *ħą́*.

ⴰ̄ꙥꕌꑦ *qamaħźə* /qaˎ-ma˥dʐəˎ/

ⴰ̄ꙧ *qalaħ* /qaˎlaˎ/

꙰ꙮ *ćʰeħje* /tɕʰeˎ-jeˎ/

ꛎꚉꙮ *ʐepeħja* /ʐeˎ-pe˥-jaˎ/

ꙧꛔꔲⴳ *kʰaićʰiħą́n* /kʰai˥tɕʰinˎ/

ꕎꙸⴳꚋꞁ *jiħliaą́ŋko* /ji˥-lianˎ-ko˥/

ⵡⵦⴳꙶ *śuśaħą́nsə* /tʂuˎtʂanˎ-səˎ/

ꕷⴳꚈꙶⴳ *tiħą́lutʰiaą́n* /tiˎlu˥tʰianˎ/

A.3 Phonology of Taoping Qiang

Taoping Qiang (羌语桃坪话) produces contrast between palatals and postalveolar consonants, and the double–consonant initial /χɢ/ was retained in it without evolving into /ʁ/, which led to the introduction of an additional set of consonants into writing practice, which is not presented in L2/22–130.

According to [SUN, 1981] and [SUN, 2016], there are 39 single–consonant initials in Taoping Qiang, and the phoneme /ɢ/ can only be found in double–consonant initials. There are 24 multi–consonant initials in Taoping Qiang, all of which are double–consonant.

/m/	ꓕ *m*	ꓕꞁ *mə* /mi˦/	/s/	ⴳ *s*	ⴳꛉ *siħ* /si˥/
/n/	ꘖ *n*	ꘖꛊ *noħ* /no˥/	/z/	ⵝ *z*	ⵝꞁ *zy* /zy˦/
/ɲ/	ꘖꞁ *ni*	‹ꘖꛊꞁ *xnioħ* /χɲo˥/	/tʂ/	ꙧ *ś*	ꙧꞁ *śo* /tʂo˦/
	ꘖ *n*	ꝥꘖꛉ *mæłnyħ* /maˎɲy˥/	/tʂʰ/	ꕙ *śʰ*	ꕙ *śʰe* /tʂʰe˦/
/ŋ/	ꜟ *ŋ*	ꜟꛉ *ŋəħ* /ŋə˥/	/dʐ/	ꙩ *ź*	ꙩ *źe* /dʐe˦/
/p/	ꓵ *p*	ꓵꛉ *piħ* /pi˥/	/ʂ/	ꙩ *ʂ*	ꙩ *ʂe* /ʂe˦/
/pʰ/	ꕠ *pʰ*	ꕠꞁ *pʰiæ* /pʰia˦/	/ʐ/	ꙧ *ʐ*	ꙧꛉ *ʐuħ* /ʐu˥/
/b/	ꓦ *b*	ꓦ *be* /be˦/	/tʃ/	ꙩ *śi*	ꙩꞁ *śiiłpæħ* /tʃɻˎpaˎ/
/t/	ⵎ *t*	ⵎꞁ *tu* /tu˦/	/tʃʰ/	ꕠ *śʰi*	ꝥꙩꞁ *małśʰii* /maˎtʃʰɻ˦/
/tʰ/	ꕐ *tʰ*	ꕐꛉ *tʰuħ* /tʰu˥/	/dʒ/	ꙩ *źi*	ꙩꞁ *źii* /dʒɻ˦/
/d/	ꓷ *d*	ꓷꞁꛊ *dałřo* /daˎʁo˦/	/ʃ/	ꙩ *ʂi*	ꙩꞁ *ʂeħ* /ʃe˥/
/k/	ꓔ *k*	ꓔꞁ *kə* /kə˦/	/ʒ/	ꙩ *ʐi*	ꙩꞁꞁ *ʐiiłʐii* /ʒɻˎʒɻ˦/
/kʰ/	ꓚ *kʰ*	ꓚꛉ *kʰueħ* /kʰue˥/	/tɕ/	ꓩ *ć*	ꓩꞁ *ćy* /tɕy˦/
/g/	ꓦ *g*	ꓦꞁ *gə* /gə˦/	/tɕʰ/	ꕤ *ćʰ*	ꕤꞁ *ćʰy* /tɕʰy˦/
/q/	ꕌ *q*	ꕌ *qeħ* /qe˥/	/dʑ/	ꓡ *ʑ*	ꓡꞁ *ʑy* /dʑy˦/
/qʰ/	ⴳ *qʰ*	ⴳ *qʰe* /qʰe˦/	/ɕ/	ꓠ *ɕ*	ꓠꞁ *ɕy* /ɕy˦/
/ɢ/	ꕌ *q*	‹ꕌꙖꙷꑲ *xqałʐəħqə*	/ʑ/	ꓟ *ʑ*	ꓟꞁ *ʑy* /ʑy˦/
		/χɢaˎʐə˥qə˦/	/f/	ꔏ *f*	ꔏⴳⴳꙶ *fułą́siiłą́* /fuˋɻˋ/
/ts/	ⵡ *ś*	ⵡꞁ *śi* /tsi˦/	/χ/	‹ *x*	‹ *xaħ* /χa˥/
/tsʰ/	ⵙ *śʰ*	ⵙꛉ *śʰiħ* /tsʰi˥/	/ʁ/	ꙵ *ř*	ꙵꛉ *řuħ* /ʁu˥/
/dz/	ⵡ *ź*	ⵡꞁ *źie* /dzie˦/	/l/	ꓘ *l*	ꓘꞁ *łoł* /loˎ/

According to [SUN, 1981] and [SUN, 2016], there are 10 single–vowel finals in Taoping Qiang. And there are 19 non–morphological multi–vowel finals, 18 morphological multi–vowel finals and 15 finals with nasal coda in Taoping Qiang.

/ɿ/	ıı ii	ᴎᴄ౪ɯ౩ᴄ̄ bziiɫme /bzɿ↓me⊣/	/yu/	ɹ yu	౮ɹɯᴄ zyuą́ /zyu⋎/
/i/	ı i	ᴎᴛ ći /tɕi⊣/	/ɹu/	ɯ iiu	⑨ɹɯᴄ ʑiiuą́ /dʑɹu⋎/
/y/	ɹ y	౩ɹ ly /ly⊣/	/ieu/	ù ieu	౩ừᴄ lieuħą́ /lieu⋎/
/e/	ᴉ́ ą́e	⌒ᴉ be /be⊣/	/iau/	ü iœu	ᴃῦᴄ pʰiœuħą́ /pʰiau⋎/
/a/	ᴆ́ ą́œ	ᵊ̈ nœħ /na⏉/	/iau/	ù iau	ᴃῦᴄ miauħą́ /miau⋎/
/ɑ/	ᴄ́ ą́a	ᵎ⌒ ba /ba⊣/	/iou/	ıᴜ iou	౩ıᴜᴄ diouą́ /diou⋎/
/o/	ᴌ o	ᴃᴌ̄ pʰoħ /pʰo⏉/	/ueu/	ᴄù ą́ueu	ᴊùᴄ řueuą́ /ʁueu⋎/
/u/	ᴄ ą́u	ᴍᴜ bu /bu⊣/	/uau/	ᴄü ą́uœu	⋔ῦᴄ kʰuœuħą́
/ə/	ᴦ ą́ə	ᴍᴨı bąź́y /bə⊣dʑy⊣/			/kʰuau⋎/
/ɚ/	ᴦᴦ ą́ər̓	ᴍᴦr bər̓ /bə⊣/	/uau/	ᴄù ą́uau	�

Lῦᴄ ś́ʰuauħą́ /ʈʂʰuau⋎/ |
/yi/	ɹı yi	ᴌɹı ś́ʰyiɫ /ʈʂʰyi⋎/	/uəu/	ᴄᴨ ą́uəu	౮ᴨᴄ zuəuą́ /zuəu⋎/
/ei/	ᴉ̀ ą́ei	ᴉ̀ᴛᴗ feiħćiħ /fei⏉tɕi⏉/	/yeu/	ừ yeu	‹ᴃùᴄ x́gyeuą́ /χgyeu⋎/
/ai/	ᴄ̈ ą́œi	ᴜ̈ıᴄᴊῦᴄ tœiɫą́piauħą́ /tai⫻piau⋎/	/yau/	ü yœu	⋔ῦᴄ ćyœuħą́ /tɕyau⋎/
			/in/	ıᴐ in	౩ᴛᴐ⫻ɹᴄ liħą́ntʰauɫą́ /lin⋎tʰau⫻/
/ɑu/	ᴄ́ ą́au	ᴍᴌᴜ maħś́ʰauɫ /maꜚʈʂʰau⋎/	/an/	ᴆᴐ ą́œn	ᴉ̈ᴐᴛ tʰœħnś́iiħ /tʰanꜚtʃɹ⏉/
/əu/	ᴄᴜ ą́əu	ᴜῦᴄù təuħą́tʰa /təu⋎tʰa⊣/			
/ie/	ì ie	ᴑì lie /lie⊣/	/un/	ᴄᴐù ą́un	౩ᴐù wuħnta /un⏉ta⊣/
/ia/	ï iœ	ᴑïᴄ diœą́ /dia⋎/	/ən/	ᴦᴐ ą́ən	ᴦῙᴐ səħą́n /sən⋎/
/iɑ/	ᴉ ia	ᴩᴉ miaħ /mia⏉/	/yn/	ɹᴐ yn	ᴩɹᴐᴑᴄᴆᴐ ć́ʰyɫnś́uɫą́n /tɕʰyn⋎tʂuŋ⫻/
/io/	ıᴌ io	ɹıᴌ tʰio /tʰio⊣/			
/ue/	ᴄì ą́ue	ᴄì řue /ʁue⊣/	/ian/	ïᴐ iœn	ᴐïᴐ‹ɹᴄ piœɫą́nxuaɫą́ /piaŋ⋎χua⫻/
/ua/	ᴄï ą́uœ	ᴜïᴩᴉ kuœ́ćʰiɫ /kua⊣tɕʰi⋎/			
/uɑ/	ᴄᴉ ą́ua	ᴄᴉ řua /ʁua⊣/	/uan/	ᴄïᴐ ą́uœn	ᴄïᴐùᴄ kʰuœħntaɫą́ /kʰuan⋎ta⫻/
/uə/	ᴄᴨ ą́uə	ᴑᴨ zuə /zuə⊣/			
/ye/	ì ye	‹ᴃì x́gye /χgye⊣/	/yan/	ìᴐ yœn	ᴨᴉᴐᴛᴉᴐ ćyœħnś́ʰuaɫn /tɕyan⏉tʂʰuan⋎/
/ya/	ï yœ	ᴨï ćyœ /tɕya⊣/			
/yɑ/	ı ya	ᴑᴩᴉ́ kuəɫtʰyaħ /kuə⋎tʰya⏉/	/iŋ/	ıᴈ iŋ	ᴃıᴈᴌᴗ pʰiɫnś́ii /pʰiŋ⋎tʂɹ⊣/
			/aŋ/	ᴄ́ᴈ ą́aŋ	ᴉ̈ᴈ ćaħŋ /tɕaŋ⏉/
/iau/	ù iau	ᴌᴄùᴌ̄ fuɫś́iauħ /fu⋎tʂiau⏉/	/uŋ/	ᴄᴈ ą́uŋ	ᴌᴈᴄᴦıı ś́uɫą́ŋś́ii
/iəu/	ᴨ iəu	ᴑıᴄᴈᴩ ś́iiliəuɫ /ʂɹ⊣liəu⋎/			/tʂuŋ⋎tʃɹ⊣/
/uai/	ᴄïı ą́uœi	ᴑïᴐᴩᴌ̈ᴄ liaŋɫkʰuœiɫą́ /liaŋ⋎kʰuai⫻/	/əŋ/	ᴦᴈ ą́əŋ	ᴦῙᴈù ləħŋtʰa /ləŋ⏉tʰa⊣/
			/iaŋ/	ïᴈ iaŋ	ᴑïᴈᴩᴜ ś́iaɫą́ŋjəuɫ /tʂiaŋ⫻iəu⋎/
/iu/	ᴜ iu	ᴑᴜᴄ ź́iuą́ /dʑiu⋎/			
/eu/	ᴉ̀ ą́eu	ᴑùᴄ ź́euą́ /dʑeu⋎/	/uaŋ/	ᴄïᴈ ą́uaŋ	‹ᴉᴈù x́uaħŋtʰa /χuaŋ⋎tʰa⊣/
/au/	ᴆ̈ ą́œu	ᴩῦᴄ bœuą́ /bau⋎/			
/ɑu/	ᴄ́ ą́au	ᴜῙᴄ ś́auħą́ /tʂau⋎/	/uəŋ/	ᴄᴨᴈ ą́uəŋ	ᴑᴐᴄᴦıı kuəɫą́ŋś́ii /kuəŋ⋎tʃɹ⊣/
/ou/	ᴌ ou	ᴌῦᴄ touħą́ /tou⋎/			
/əu/	ᴄᴜ ą́əu	ᴃῦᴄ pʰəuħą́ /pʰəu⋎/			

According to [SUN, 1981] and [SUN, 2016], there are 6 tones in Taoping Qiang.

ᴑᴎᴛ̄	ź́iħ	/dʑi⏉/	ᴼῙᴄù	kœiɫą́tʰa /kai⫻tʰa⊣/
ᴑᴨ	ź́iɫ	/dʑi⋎/	ᴑı	ź́i /dʑi⊣/
ᴼῙᴄù	kœiħą́tʰa /kai⋎tʰa⊣/	ᴑᴄ	ź́ią́ /dʑi⋎/

A.4 Phonology of Baishui Qiang

The copula in Qiang *ŋuə pronounces /vəɴ/ in Baishui Qiang (羌语白水话), which led to the Rma letter for /v/, which is not used in Qugu Qiang. According to [WANG & YU, 2021], there are 36 initials in Baishui Qiang, all of which are single–consonant initials.

/m/	ꓓ *m*	ꓓꓶ *mu* /muɴ/		/pʰ/	ꓭ *pʰ*	ꓭꓴ̃ *pʰataħ* /pʰaɴtaꓶ/
/n/	ꓘ *n*	ꓘꓵ̃ *natuħ* /naɴtuꓶ/		/b/	ꓭ *b*	ꓭ *ba* /baɴ/
/ɲ/	ꓘꟷ *ni*	ꓘꟷ̃ *niuħ* /ɲuꓶ/		/t/	ꓴ *t*	ꓴ *tu* /tuɴ/
	ꓘ *n*	ꓘꟷ *ni* /ɲiɴ/		/tʰ/	ꓵ *tʰ*	ꓵꓶ̃ *tʰoħ* /tʰoꓶ/
/ŋ/	ꓱ *ŋ*	ꓱꟷ *ŋi* /ŋiɴ/		/d/	ꓵꟷ *d*	ꓵꟷ̃ *duħ* /duꓶ/
/p/	ꓛ *p*	ꓛꓶ *pu* /puɴ/		/k/	ꓳ *k*	ꓳꓶ *ku* /kuɴ/
/kʰ/	ꓛ̄ *kʰ*	ꓛ̄ꓶ *kʰa* /kʰaɴ/		/ʐ/	ꓱꓴ *ʐ*	ꓱꓴ *ʐu* /ʐuɴ/
/g/	ꓭ *g*	ꓭꓶ *go* /goɴ/		/tɕ/	ꓩ *ɕ*	ꓩꓬꓶ̃ *ɕ́oħ* /aɴtɕoꓶ/
/q/	ꓷ *q*	ꓷꓶ *qo* /qoɴ/		/tɕʰ/	ꓩ *ɕʰ*	ꓩꓶꓳꟷ *ɕʰoko* /tɕʰoɴkoɴ/
/qʰ/	ꓖ *qʰ*	ꓶꓖ *puqʰaħ* /puɴqʰaꓶ/		/dʐ/	ꓩꓲ *ʑ́*	ꓩ̃ꓸ *ʑ́uxa* /dʑuɴχaɴ/
/t͡s/	ꓜ *ɕ́*	ꓜ *ɕ́a* /t͡saɴ/		/ɕ/	ꓘ *ɕ*	ꓘꓶꓳꟷ̃ *ɕokʰuaħ* /ɕoɴkʰuaꓶ/
/t͡sʰ/	ꓴ̃ *ɕ́ʰ*	ꓴ̃ꟷ̄ *ɕ́ʰapeħ* /t͡saɴpeꓶ/		/ʑ/	ꓮ *ʑ*	ꓮ̃ *ʑe* /ʑeꓶ/
/d͡z/	ꓝ *ʑ́*	ꓝꓬꟷ̃ *ʑ́uħpiaħ* /d͡zuꓶpiaꓶ/		/f/	ꓕ *f*	ꓕꓨꓶꓲ *ʃ́ə́nfu* /t͡ʂənɴfuɴ/
/s/	ꓖ *s*	ꓖꟷ *su* /suɴ/		/v/	ꓓꟷ *v*	ꓓꟷ *və* /vəɴ/
/z/	ꓨꟷ *z*	ꓨꟷ *zo* /zoɴ/		/x/	ꓰ *x*	ꓰ *xu* /xuɴ/
/t͡ʂ/	ꓱꟷ *ʃ́*	ꓱ̃ *ʃ́aħ* /t͡ʂaꓶ/		/ɣ/	ꓮꓶ̄ *ɣ*	ꓮꓶ̄ *ɣoħ* /ɣoꓶ/
/t͡ʂʰ/	ꓯ *ʃ́ʰ*	ꓯ̄ *ʃ́ʰuħ* /t͡ʂʰuꓶ/		/χ/	ꓢ *x́*	ꓢꓶ *x́o* /χoɴ/
/d͡ʐ/	ꓲꟷꓶ̄ *ʑ́*	ꓙ̃ꓶ̄ *jyħʑ́oħ* /yꓶd͡ʐoꓶ/		/l/	ꓨ *l*	ꓨꟷ *lu* /luɴ/
/ʂ/	ꓵꓴ *ʂ*	ꓵꓴꟷ *ʂu* /ʂuɴ/				

According to [WANG & YU, 2021], there are 22 finals in Baishui Qiang.

/i/	ꟷ *i*	ꓳꟷ *ki* /kiɴ/		/uei/	ꓳꟷ̀ *ɕ́uei*	ꓳꟷ̀ *kuei* /kueiɴ/
/y/	ꟷꟷ *y*	ꓘꟷ *ɕy* /ɕyɴ/		/in/	ꟷꓒ *in*	ꓘꟷꓒ *ɕián* /ɕinↄ/
/e/	ꓷ̀ *ɕ́e*	ꓸ̀ *ke* /keɴ/		/an/	ꓷꓒ *ɕ́an*	ꓴ̆ꓒ *kaħn* /kanꓶ/
/a/	ꓷ̀ *ɕ́a*	ꓵꟷꓸ̃ *ʂaka* /ʂaɴkaɴ/		/on/	ꓨꓒ *on*	ꓳꓶꓐꓨꓒ *koħnluá*
/o/	ꓨꓶ *o*	ꓷꓶ *qo* /qoɴ/				/konꓶluↄ/
/u/	ꓮ *ɕ́u*	ꓸꟷ̃ *kuħ* /kuꓶ/		/oŋ/	ꓨꓱ *oŋ*	ꓶꓱꓓꓨ *noŋmin*
/ə/	ꓱ *ɕ́ə*	ꓵꟶ *tʰə* /tʰəɴ/				/noŋɴminɴ/
/ɚ/	ꓱꓵ *ɕ́əɹ*	ꓳꓵ *kəɹ* /kəɴ/		/ən/	ꓱꓒ *ɕ́ən*	ꓖꓒ *sən* /sənɴ/
/ia/	ꟷ *ia*	ꓓꟷ *mia* /miaɴ/		/əŋ/	ꓱꓱ *ɕ́əŋ*	ꓶꟷꓱ̃ *təħŋʃ́aħ* /təŋꓶt͡ʂaꓶ/
/ua/	ꓳꟷ *ɕ́ua*	ꓳꟷ *kua* /kuaɴ/		/ian/	ꟷꓒ *ian*	ꓴꟷꓒꓱ *tiantəħn*
/au/	ꓷ̀ꟷ *ɕ́au*	ꟷꓶꓴ *tʰauʃ́ə* /tʰauɴt͡ʂəɴ/				/tianɴtənꓶ/
/ou/	ꓨꟷ *ou*	ꓳꟷ *kou* /kouɴ/		/uən/	ꓳꟷꓒ *ɕ́uən*	ꓨꟷꓒ *wən* /uənɴ/
/iau/	ꟷ̀ *iau*	ꓳꟷ̀ꓐꓒ *piauʑan*				
		/piauɴʑanɴ/				

According to [WANG & YU, 2021], there are 3 tones in Baishui Qiang.

ꓖ̃ *saħ* /saꓶ/		ꓲꓖ *x́aɕ́* /χaↄ/
ꓖ̃ *sa* /saɴ/		

Note that the draft of Latin Qiang used to use ⟨rl⟩ to record /ʎ̟/, but since only Qugu Qiang contains this phoneme, ⟨l⟩ was used to record /ʎ̟/ for simplicity.

IPA	/p/	/pʰ/	/b/	/m/	/f/	/w/	/t͡s/	/t͡sʰ/	/d͡z/	/s/	/z/	/t/	/tʰ/	/d/	/n/
Rma	ꓛ	ꓐ	ꓜ	ꓟ	ꓥ	ꓦ	ꓵ	ꓴ	ꓶ	ꓷ	ꓸ	ꓹ	ꓚ	ꓕ	ꓳ
Latin	b	p	bb	m	f	w	z	c	zz	s	ss	d	t	dd	n
IPA	/l/	/ɬ/	/t͡ʂ/	/t͡ʂʰ/	/d͡ʐ/	/ʂ/	/ʐ/	/t͡ɕ/	/t͡ɕʰ/	/d͡ʑ/	/ɲ/	/ɕ/	/ʑ/	/j/	/k/
Rma	ꓮ	ꓑ	ꓪ	ꓧ	ꓨ	ꓲ	ꓩ	ꓰ	ꓫ	ꓬ	ꓭ	ꓢ	ꓠ	ꓜ	ꓡ
Latin	l	lh	zh	ch	dh	sh	rr	j	q	jj	ny	x	xx	y	g
IPA	/kʰ/	/g/	/ŋ/	/x/	/ɣ/	/q/	/qʰ/	/χ/	/ʁ/	/h/	/ɦ/	/ʎ̟/	/ʔ/		
Rma	ꓩ	ꓭ	ꓱ	ꓵ	ꓶ	ꓷ	ꓒ	ꓝ	ꓚ	ꓢ	ꓞ	ꓨ	ꓖ		
Latin	k	gg	ng	h	hh	gv	kv	v	vv	hv	vh	l			
IPA	/i/	/e/	/æ/	/ə/	/a/	/o/	/u/	/y/	/ɚ/	/õ/					
Rma	ı	◌̀	◌̈	◌ꓘ	◌̇	ꓡ	◌ꓳ		ꓩ	◌ˏ					
Latin	i	ea	ae	e	a	o	u	ui	r	nn					

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