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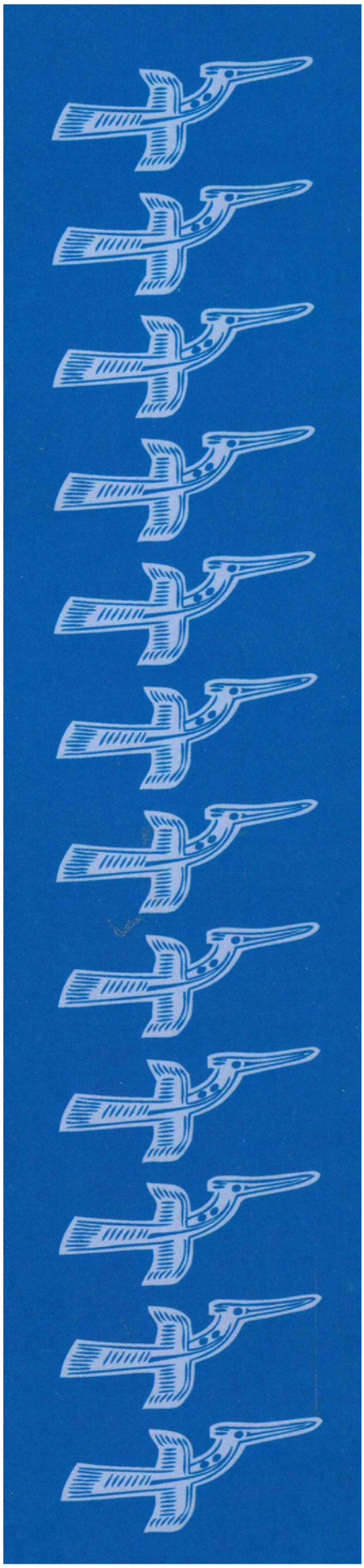

Authors: Peter NORQUEST
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A Revised Inventory of Proto Austronesian Consonants: Kra-Dai and Austroasiatic Evidence[1]

Peter Norquest
The University of Arizona

Abstract
This paper examines the Kra-Dai and Austroasiatic evidence for a revised Proto Austronesian consonant inventory that includes three new phonemic distinctions (*f, *g, and *l̩) and an expanded domain for two others (*t̪ and *c). Corroborative evidence is found in Kra-Dai, strengthening the hypothesis of a genetic relationship (Austro-Tai) between Kra-Dai and Austronesian. Evidence from Austroasiatic is weaker, but still suggestive of a non-accidental relationship with Austro-Tai, through either genetic relatedness or contact.
Keywords: Austronesian, Kra-Dai, Austroasiatic, reconstruction, phylogeny
ISO 639-3 language codes: nia, otd, bhp, hvn, nfa, lic, onb

0.0 Introduction

In Norquest & Downey (2013, forthcoming) it is argued that a set of phonological distinctions have been preserved in certain subgroups and languages throughout the greater Austronesian-speaking world. Besides the Formosan languages, these also include: the North Sarawak, Sabahan, and Northwest Barito groups on Borneo; the languages of the Philippines in the northwest; Nias in the southwest; Oceanic in the northeast; and various languages of Nusa Tenggara in the southeast.

This evidence allows for the reconstruction of several additional PAn consonants, as well as a more specific phonetic interpretation of existing phonemes (*C, *j, *z, *N, *S, *R, and *g). The present analysis is supported to various degrees by evidence from Kra-Dai families, allowing refinements of reconstruction in both phyla and ultimately supporting the hypothesis of a genetic relationship between the two.

Although there is some debate about the total number of reconstructible Proto-Austronesian consonants as well as their phonetic interpretation (see Wolff 2010 for discussion), the consensus inventory of PAn consonants cited in most references on Austronesian phonology is the following (Adelaar & Himmelmann 2005:5):

Table 1: The Proto Austronesian Consonant Inventory

p	t	C	c	k	q	ʔ
b	d	j	z	g		
	s		S			h
m	n		ɲ	ŋ		
	l		N			
w	r		y		R	

Of the phonemes above, *j, *z, *S, and *R are firmly established, but their phonetic interpretation is still debated. Wolff argues that *C and *ɲ are allophones of *t and *N respectively, and do not need to be reconstructed for PAn (Wolff 2010: 32). *g, *r, and *c are of comparatively low-frequency and therefore more controversial (for discussion of each of these, see Blust 2009);

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*c also has a restricted geographic distribution in western Indonesia, and is limited largely to frozen monosyllabic morphemes and their prefixes (Norquest & Downey 2013).

This paper follows the proposal originally explicated in its full form by Benedict (1975), in which he argues that Austronesian and Kra-Dai (Tai-Kadai) are genetically related (Austro-Tai[2]). While a definitive argument for this hypothesis remains premature until a full reconstruction of Kra-Dai has been completed, it can nevertheless be stated with confidence that there is a non-accidental relationship between these two language phyla which must be due to either genetic relationship or contact and that the former appears to be the more likely explanation.

The outline of this paper is the following: section 1 presents the evidence for a group of new phomemic distinctions in Proto Austronesian (PAn) which in turn informs the revision of the Proto Austronesian forms given below (Revised Austronesian, or RAn). Section 2 comprises the main body of this paper in which RAn forms are compared with putative cognates from two of the four branches of Kra-Dai: Hlai and Be-Tai. Section 2.1 discusses the distinction between *p and *f, 2.3 retroflex consonants, 2.4 palatal consonants, and 2.5 uvular consonants; section 3 examines the more tentative question of what evidence – if any – is to be found in Austroasiatic; section 4 concludes.

1.0 Additional phonemic distinctions in Austronesian

Correspondences between certain key languages and subgroups are presented in table 2 (for additional witnesses, see Norquest & Downey 2013, forthcoming). The languages used in these tables are the following: Nias is a language of the Barrier Islands off of the northwest coast of Sumatra; Dohoi is a member of the northwest Barito group of languages on Borneo; Bimanese, Proto Sumba, and the closely related Proto Hawu-Dhao are all languages of western Nusa Tenggara; and Proto Western Oceanic (PWOc) is a subgroup of Proto Oceanic (POc) (see Ross 1988):

Table 2: Five additional phonemic distinctions in PAn

PAn	RAn	Nias[3]	Dohoi[4]	Bima	PSumba	PHD	PWOc
*p	*p	f-	-p-	p	*p	*p	*p
*p	*f	[β-]	-hp-	f	*p	*0	*β
*t	*t	t-	-t-	t	*t	*t	*t
*C	*ʈ	[d-]	-ht-	d	*t	*ɖ	*t
*s	*s	[z-]	-s-	s	*s	*s	*z
*s	*c	s-	-s-	c	*ç	*c	*s
*k	*k	k-	-k-	k	*k	*k	*k
*k	*g	[g-], -ʔ-	-hk-	h	*ɣ	*0-, *-ʔ-	*ɣ
*g	*ɢ	(g)	(g)	g	*g	*ɠ	*g
*l	*l	l	-ɾ-	l	*l	*l	*l
*l	*ɭ	l	-ɾ-	r	*l	*ɾ	*l

Table 2 provides the correspondences for five additional distinctions that we use as evidence to reconstruct an additional three novel PAn phonemes (*f, *g, and *ɭ) and expand the scope of two more (*ʈ, which has until now only been distinguished in certain Formosan languages, and *c, the evidence for which has been restricted to a handful of WMP languages); it also includes reflexes of the voiced uvular stop *ɢ (traditional PAn *g) for comparison. Revised Austronesian (RAn) reconstructions are placed to the right of traditional Proto Austronesian ones. For more on these five phonemes, see Norquest & Downey (2013):

[2] Benedict originally spelled this 'Austro-Thai'; it is referred to here as 'Austro-Tai' in keeping with more recent convention, reserving the spelling 'Thai' for a political designation and using 'Tai' as a linguistic designation.

[3] The distinctions in the Nias initials have gone unrecognized in the past because they depend on environment. Lase (2011: xxiv-xxv) describes these as "initial mutations", where the initial of a word undergoes a change in the middle or at the end of the sentence (i.e. in an intervocalic position within a phrase). "Mutated" forms are given in square brackets.

[4] Distinctions in Dohoi occur only in intervocalic position.

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The revised PAn consonant inventory proposed here is thus the following (traditional phonemes with revised phonetic interpretations are placed in parentheses):

Table 3: The revised Proto Austronesian consonant inventory

p	t	ʈ (C)	c	k	q	ʔ
b	d	ɖ (j)	ɟ (z)	g	ɢ (g)	
f	s		ç (S)			h
m	n		ɲ	ŋ		
	l	ɭ	ʎ (N)			
w	r		j (y)		ʁ (R)	

Examples of traditional *p, *t, *s, and *k are given in (4) in initial position, and in (5) in medial position. Traditional Proto Austronesian (PAn) forms are given on the far left, with Revised Austronesian (RAn) forms following; when a PAn form lacks Formosan reflexes (i.e. when it can be reconstructed to the level of Proto Malayo-Polynesian (PMP)), it is placed in brackets (PMP *h is projected back to PAn *S, of which it is the regular reflex). Forms with unexpected reflexes in all examples are placed in parentheses. Since the literature has tended to focus on exceptional rather than regular correspondences, it is more difficult to find examples with traditional phonemes than it is those with the novel phonemes proposed in this paper:

(1) Examples of initial *p, *t, *s, and *k

Gloss	PAn	RAn	Nias	Bima	PSumba	PHD	PWOc
seven	*pitu	*piʈu	fitu	pidu	*pitu	*piɖu	---
three	*telu	*təlu	təlu	tolu	*t[ə]lu	*təlu	---
elbow	*siku	*sigu	[z]iʔu	(cihu)	*siɣu	*siʔu	---
scratch	*kaRaw	*kaʁaw	---	kao	*kaʔu	*kao	---

(2) Examples of medial *p, *t, *s, and *k

Gloss	PAn	RAn	Dohoi	Bima	PSumba	PHD	PWOc
four	*Sepat	*çə[p]ac	(ohpa)	upa	*pat-ə	*əpa	(*βati)
calf	*beties	*bətiəs	boti	wisi	*βici	---	---
sea	*tasik	*ʈasik	---	dasi	*tasik	*ɖasi	---
open	[*bukas]	*ɓukas	---	---	*ɓukas	*mboka	---

Examples revised to show PAn *f, *ʈ, *c, and *g in initial and medial positions are given in (3) and (4) below:

(3) Examples of initial *f, *ʈ, *c, and *g

Gloss	PAn	RAn	Nias	Bima	PSumba	PHD	PWOc
turtle	*peŋu	*fəŋu	[β]ənu	fonu	---	*əŋu	*βoŋu
feces	*CaqiS	*ʈaqiç	[d]ai	(taʔi)	*tai	*ɖei	---
nine	*siwa	*ciwa	siwa	ciwi	*çiwa	*ceo	---
tree, wood	*kaSiw	*gaçiw	[g]eu	hadʒu	*ɣaju	*aʃu	*ɣaju

(4) Examples of medial *f, *ʈ, *c, and *g

Gloss	PAn	RAn	Dohoi	Bima	PSumba	PHD	PWOc
dream	[*S-in-ipi]	*ç-in-ifi	nuhpi	nifi	*nipi	*nii	*m-niβi
die	*m-aCay	*m-aʈaj	mahtoi	made	*mate	*maɖe	---
one	*isa	*ica	ihco	ica	*içа	*əci	---
1sg	*i-aku	*i-agu	ahku	n-ahu	*jauwa	*ɟaʔa	*[i]au

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Outside of Nusa Tenggara, evidence for the distinction between *l and *ɭ has been preserved best in Proto Philippines (Paz 1981). Examples of alveolar laterals are given in (5) and retroflex laterals in (6):

(5) Examples of *l

Gloss	PAn	RAn	PPhilippines	Bima	PHD
buy	*beli	*bəli	*bəlíʔ	weli	*βəli
five	*lima	*lima	*limáʔ	lima	*ləmi

(6) Examples of *ɭ

Gloss	PAn	RAn	PPhilippines	Bima	PHD
moon	*bulaN	*buɭaʌ	*búɭan	wura	*βəru
eight	*walu	*waɭu	*waɭúʔ	waru	*aru

2.0 Kra-Dai Comparisons

Having provided the evidence for the above distinctions in PAn, we can now turn our attention toward Kra-Dai, with an eye toward establishing whether or not evidence from the two phyla is mutually corroborative. Two of the four primary Kra-Dai branches have been used for comparison with our Revised Austronesian forms: Be-Tai and Hlai. The branches cited include Proto North Tai (PNT) and Proto Central-Southwest Tai (PC/SWT) (data for both is taken from Pittayaporn 2009), Proto Be (PBe, Norquest ms), and Proto Hlai (PHlai, Norquest 2007). Proto Kam-Sui (including Biao and Lakkja) and Proto-Kra reconstruction is currently ongoing, and these families are not included in the present paper. It is possible that Be-Tai and Hlai form a higher node within the Kra-Dai phylum; if this is the case, it should be understood that 'Kra-Dai' below technically refers to this subgrouping (Tai-Hlai), although the majority of what is discussed appears to apply to the Kam-Sui and Kra branches as well.

The comparisons below have been selected because they appear reasonable on both semantic and phonological grounds. Although a few of them are novel, most of them have been suggested elsewhere in the literature. In the majority of cases, Kra-Dai forms correspond with the final syllable in an Austronesian word. This is, of course, technically ambiguous in the case of reduplicants and roots, and the only possibility in the case of monosyllabic words.

(7) Examples of RAn reduplicants, roots, and monosyllables

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
mouth	*baqbaq	---	*paak	*paak	*paak
chest, liver	*dəbdəb	---	*t[ə]p	*tap	*tap
hold in fist	*ɢəmɢəm	---	---	*kam	*kam
slap	*-pik, *-bik	*p^{h}i:k	---	---	---
fall	*-tuq	*t^{h}ok	*tɔk	*tok	*tok
bite	*-kət	---	---	*kat	*kat
eat, feed	*gaŋ	*k^{h}ən	*kən	*kɯŋ	*kin
to skin, peel	*-ʎiʈ	*hli:t	---	---	---

Note that the regular outcome for plain voiced initials in all Kra-Dai branches was devoicing. Although it appears to have occurred very early in both Proto Be-Tai and Proto Hlai, it may not be reconstructible for Proto Kra-Dai. The merger of the velar and uvular stops (both voiceless and voiced) in initial and final positions appears to have occurred very early as well:

In a minority of cases, Kra-Dai forms correspond with the penultimate syllable of the Austronesian forms. These presumably correlate with words with original penultimate stress, the final unstressed -V(C) ending having undergone erosion and eventual deletion (segments preserved in Kra-Dai are placed in angle brackets):

(8) Examples of RAn forms with penultimate stress

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
blind	*<ɓuɻ>a	---	---	*ɓo:t	*ɓo:t
flood	*<baç>aq	*ɓa:ɦ	---	---	*ɓa:h
ten	*<fuɭ>uq	*fu:t	---	---	---
astringent	*a<fəɭ>əd	---	---	*fɯət	*fa:t

The majority of Kra-Dai forms correlate with the final syllables of Austronesian words. In cases where the medial consonant is a voiceless stop, the entire first syllable is lost:

(9) Medial voiceless stops

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
ancestor, grandfather	*apu	*p^{h}u:ʔ	---	*pawh	*pu:h
cut	*[q]ətəs	*t^{h}ət	---	*tac	*tat
headlouse	*guɻu	*tʃ^{hw}u:	---	*hraw	*t^{h}raw
hold in cupped hands	*ra(ŋ)kup	*k^{h}op	*kup	---	*ko:p

The one exception to this is cases of *m-ɻ sequences:

(10) *m-ɻ sequences

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
eye	*maɻa	*tʃ^{h}a:	*ta:	*p-ta:	*p-t^{h}ra:
die	*m-aɻaj	---	*ta:j	*p-ta:j	*p-t^{h}ra:j

The case of medial voiced stops is more complicated than that of voiceless stops, since their realization in Kra-Dai depended on the original preceding vowel (for full discussion, see Norquest & Downey forthcoming). In the majority of languages, when the preceding vowel was schwa, the following voiced stop was phonetically lengthened and became an implosive depending on place of articulation.

Table 4: Reflexes of voiced medial consonants after non-schwa and schwa vowels

PKD	PHlai	PBe	PNT	PC/SWT	PKD	PHlai	PBe	PNT	PC/SWT
*-Vb-	*ʊ	*C-b	*C-b	*ɓ	*-əb-	*ɓ	*C-b	*ɓ	*ɓ
*-Vd-	*ɾ	*C-r	*C-d	*ɗ	*-əd-	*ɗ	*C-r	*ɗ	*ɗ
*-Vɖ-	*ɾ	*C-r	*ɖ	*ɗ	*-əɖ-	*ɗ	*C-r	*ɗ	*ɗ
*-Vɟ-	*hj	(*z)	*j	*j	*-əɟ-	*tç	*C-j	*ʔj	*ʔj
*-Vg-	*ɦ	*g	*ɣ	*ɣ	*-əg-	*k	?	?	?

Initial syllables were also lost when a medial consonant was an implosive:

(11) Medial implosives

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
spring, well	*təbuʀ	---	---	*ɓo:h	*ɓo:h
soak	*ədəm	*ɗə:mʔ	---	---	---
borrow	*çəɟam	---	---	---	*ʔjɯ:m

As described above, there was a tendency for anterior medial voiced stops to undergo secondary implosion, particularly in PC/SWT and most NTai languages with the exception of Saek. They generally underwent lenition in PHlai and PBe (with the exception of *-b- in Qiongshan). Posterior medial voiced stops underwent lenition in all branches:

(12) Medial voiced stops

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
shoulder	*qabaʁa	*ʊa:ɦ	*C-biaʔ	*C-ba:h	*ɓa:h
live, raw	*qudip	*Cuɾi:p	*C-rep	*C-dip	*ɗip
sun, star	*qaɖaw	*ɾa:w	---	*ɖa:w	*ɗa:w
fence, field dike	*paɢər	*Ciɦə:n[5]	---	*ɣal	*ɣan

There are some forms in which the first syllable was lost before the medial stops underwent implosion or lenition. In these cases, they developed in the same way as initial stops:

(13) Medial voiced stops: early loss of first syllable

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
father	*a<ba>	*pʰa:ʔ	---	---	---
sharp	*ʈa<ɟəm>	*tçʰə:m	---	---	---
dirt on skin	*da<gi>	*kʰi:	---	---	---

Initial syllables are also lost before medial fricatives. However, the fricative themselves underwent optional intervocalic voicing, depending apparently on the timing of the loss of the initial syllable. Examples of the voiced fricatives are given in (14) and of voiceless fricatives in (15). It is possible that the PHlai forms in (14) were voiced in Pre-Hlai, since all initial voiced obstruents had devoiced by the time of Proto Hlai (see Norquest 2007 for details):

(14) Medial fricatives: intervocalic voicing

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
fire	*çafuj	*fi:	*wi:	*vi:	*vaj
tooth	*-ifən	*fjən	(*sen)	*van	*van
wash (clothes)[6]	*ba[s]əq	*sɯ:k	*dak	*zak	*zak

(15) Medial fricatives: early loss of first syllable

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
water tortoise	*qaʈi<[f]a>	---	---	*fɯə	*fa:
blow the nose	*ə<səŋ>	---	---	*saŋh	*saŋh
sour	*-[s]əm	---	---	*somʔ	*somʔ
2sg, 2pl	*i<çu>	*səw	*su	*su:	*su:

In many words with medial liquids, the preceding consonant has been preserved through the formation of an initial consonant cluster:

(16) Medial liquids

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
buy, exchange	*bəli	*p-ləj	---	---	---
spotted with white	*[ɓ]əlaŋ	---	---	*ɗa:ŋh	*ɓla:ŋh
dark (red)	*tiləm	---	---	*klamh	*klamh
saliva	*ŋalaj	*hlə:j	*ma[:]j	*mla:j	*mla:j
hear, listen (PF)	*tumaʎa	*p-lɯ:	---	---	---
head	*quʟu	*Curəwʔ	---	*krawʔ	---
taro	*biʁaq	*ra:k	*ʃa:k	*prɯək	*pʰrɯək
ribcage	*taɢəʁaŋ	*kʰa:ŋʔ	---	---	*kʰra:ŋʔ

[5] The first vowel in this comparison doesn't match; it may not be valid unless *-ɢər is a root.

[6] The Austronesian evidence suggest that there may have been two original roots, *-səq and *-cəq, for 'wash clothes' and 'wet' respectively. See also Proto Be *ɟak 'wet'.

In other cases, the initial syllable was lost completely, leaving the medial liquid as the onset:

(17) Medial liquids: early loss of first syllable

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
snake	*çu<laʀ>	*lja:ɦ	---	---	---
fear(ful)	*ta<law>	---	---	*hla:w	*hla:w
three, two	*tə<lu>	*hlu:	---	---	---
child	*a<ʎak>	*hlɯ:k	*lɯk	*lɯk	*lu:k
eight	*wa<ɭu>	*ru:	---	---	---
indigo (grass)	*ʈa<ʁum>	---	---	*hro:mʔ	*[h/s]o:mʔ
dry, withered (PF)	*qa<ʁiw>	---	*ʃ[o]:	*hriəw	*hiəw
cut, reap (PF)	*kə<ʁət>	*rət	---	---	---

*2.1 Kra-Dai *p and *f*

The Kra-Dai correspondences for initial and medial *p and *f are given below:

Table 5: Correspondences for initial and medial *p and *f

RAn	PHlai	PBe	PNT	PC/SWT
*p-	*p^{h}	*p	*p	*p
*-p-	*p^{h}	*p	*p	*p
*f-	*f	(*f)	*f	*f
*-f-	*f	*w	*v	*v

With the exception of the secondary aspiration which all voiceless stops underwent in Proto Hlai, *p remained unchanged in Kra-Dai:

(18) Examples of *p

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
ancestor, grandfather	*apu	*apu	*p^{h}u:ʔ	---	*pawh	*pu:h
slap	*-pik, *-bik	*-pik, *-bik	*p^{h}i:k	---	---	---
to cover	[*lipud]	*lipud	*p^{h}ɯt	---	---	---

*f remained unchanged in initial position, but underwent intervocalic voicing in medial position (this depended on the timing of the loss of the previous syllable, as discussed above).

(19) Examples of *f

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
ten	*puluq	*fuɭuq	*fu:t	---	---	---
astringent	[*apeled]	*afəɭəd	---	---	*fɯət[7]	*fa:t
water tortoise	*qaCipa	*qaʈi[f]a	---	---	*fɯə	*fa:
fire	*Sapuy	*çafuj	*fi:	*wi:	*vi:	*vaj
tooth	*-ipen	*-ifən	*fjən	(*sen)	*van	*van

Note that *-ɭ in final position often became *-t in Kra-Dai, perhaps through the fortition *-ɭ > *-ɖ > *-ʈ > *-t (but see 'body hair' in (28) for an exception)[8].

[7] The PTai reflexes imply a low vowel in the nucleus; for a possible explanation see section 2.3.3 below.

[8] 'Flea' (RAn *qatiməla, PHlai *hmə:t, PBe *C-mat, PTai *hmat), is an example of the opposite kind, where the expected PKD final is *-l. One possible solution to this is to posit metathesis of *l and *t in Austronesian in which the original form was *qali-məta with the animal prefix *qali-; in this case, Kra-Dai would have preserved the original form.

2.3 Kra-Dai retroflex consonants

2.3.1 Kra-Dai *t and *ʈ

Reflexes of *t and *ʈ in initial and medial position are given below:

Table 6: Correspondences for initial and medial *t and *ʈ

RAn	PHlai	PBe	PNT	PC/SWT
*t-	*t^{h}	*t	*t	*t
*-t-	*t^{h}	*t	*t	*t
*ʈ-	*ʧ^{h}	*t	*hr	*t^{h}r
*-ʈ-	*ʧ^{h}	*t	*t	*t^{h}r

RAn *t remained unchanged in Kra-Dai, with the exception of 'land leech' in PTai:

(20) Examples of *t

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
hit, play	*-teg	*-təɢ	---	---	*tɯk	*tɤk
pound	*-tug	*-tuɢ	---	---	*to:k	*to:k
fall	*-tuq	*-tuq	*t^{h}ok	*tɔk	*tok	*tok
cut	[*[q]etes]	*[q]ətəs	*t^{h}ət	---	*tac	*tat
cut, reap (PF)	*ketun	*kətun	*t^{h}u[n/ɲ]	---	---	---
seven (PF)	*pitu	*pitu	*t^{h}u:	---	---	---
fart	*qetut	*qətut	*t^{h}u:[t/c]	*tot	(*hroc)[9]	*tot
land leech	*qaNi-matek	*qaʎi-matək	*t^{h}a:k	*ta:k	*da:k	*da:k

The PKD vocalism in 'land leech' probably results from contamination with RAn *qaʎi-məʈaq 'river leech'. The voiced initial in Proto Tai may be due to nasal voicing assimilation: *mətak > *nta:k > *da:k.

The comparisons involving RAn and PKD *ʈ are well-known:

(21) Examples of *ʈ

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
headlouse	*kuCu	*guʈu	*ʧ^{hw}u:	---	*hraw	*t^{h}raw
eye	*maCa	*maʈa	*ʧ^{h}a:	*ta:	*p-ta:	*p-t^{h}ra:
die	*m-aCay	*m-aʈaj	---	*ta:j	*p-ta:j	*p-t^{h}ra:j

The Kra-Dai forms only preserve the final syllable of 'headlouse', although the labiovelar glide in the PHlai form may be a vestige of the first vowel. As with many *m-initial forms (for more examples see (13) above), the initial *m- in 'eye' and 'die' appears to have denasalized to *b- and then undergone regular left-edge devoicing in PTai:

*maʈa > *bəʈa: > *p-ʈa: 'eye'

2.3.2 Kra-Dai *l and *ɭ

While RAn *l is reflected in Kra-Dai as a lateral, *ɭ has rhotic reflexes:

[9] This is a reflex of *ʈ instead of the expected *t.

Table 7: Correspondences for initial and medial *l and *ɭ

RAn	PHlai	PBe	PNT	PC/SWT
*l-	*hl	*l	*l	*l
*-l-	*C-l, *lj	*l	*(h)l	*(h)l
*ɭ-	*r	*r	*r	*r
*-ɭ-	*r	*ʃ	*r	*^{h}r

Examples of *l are given below in (22), and of *ɭ in (23):

(22) Examples of *l

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
snake	*SulaR	*çulaʁ	*lja:ɦ	---	---	---
swallow	*-len	*-lən	---	---	---	*klɯ:n
fear(ful)	*talaw	*talaw	---	---	*hla:w	*hla:w
sink (into mud)	*-lem	*-ləm	---	---	*hlomh	*hlomh
roll, roll up	*luluN	*luluʌ	*C-lun	---	---	---
forget (PF)	*alim	*alim	---	---	*lum	*lɯ:m
dark (red)	*-lem	*-ləm	---	---	*klamh	*klamh
three, two	*telu	*təlu	*hlu:	---	---	---
saliva	[*ŋalay]	*ŋalaj	*hlə:j	*ma[:]j	*mla:j	*mla:j

(23) Examples of *ɭ

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
sesame	*leŋa	*ɭəŋa	*hŋɯ:	---	*ŋra:	*ŋa:
centipede	*qalu-Sipan	*qaɭu-çifan	(*ri:p)	*rep	(*sip)	*k^{h}rep
head	*qulu	*quɭu	*Curəwʔ	---	*krawʔ	---
to plant	[*mula]	*muɭa	*Cura:	*ʃa:	---	---
sell	*saliw	*sa[ɭ]iw	*ri:wʔ	---	---	---
eight	*walu	*waɭu	*ru:	---	---	---

2.3.3 The effects of retroflex consonants on vocalic nuclei

Retroflex consonants appear to have had a centering effect on a following *u; this appears to be consistent in P(Be-)Tai but more sporadic in PHlai:

(24) Effects of initial retroflexes on vowels after high vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
headllouse	*guɭu	*ʧ^{hw}u:	---	*hraw	*t^{h}raw
two, four	*ɖuça	*ʧ^{h}əwʔ	---	---	---
nose, face	*uɖuŋ	*ɗəŋ	*C-raŋ	*ɗaŋ	*ɗaŋ
head	*quɭu	*Curəwʔ	---	*krawʔ	---
eight	*waɭu	*ru:	---	---	---

There appears to be a correlation between final retroflex consonants and the lengthening (and lowering at least in the case of *ə) of the preceding vocalic nuclei (PNT ‘body hair’ is an exception):

(25) Effects of final retroflexes on vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
to skin, peel	*-ʎiʈ	*hli:t	---	---	---
tough, sticky	*-kəʈ	*k^{h}a:t	---	---	---
blind	*[ɓuʈ]a	---	---	*ɓo:t	*ɓo:t
body hair	*[bu[]u	---	---	*pul	---
ten	*[fu[]uq	*fu:t	---	---	---
astringent	*a[fə[]əd	---	---	*fɯət	*fa:t

2.4 Kra-Dai palatal consonants

2.4.1 Kra-Dai *c, *s, and *ç

Since we distinguish RAn *c and *s, and since RAn *s and *ç appear to have merged in Kra-Dai as *s, all three correspondence sets are presented in the table below:

Table 8: Correspondences for initial and medial *c, *s, and *ç

RAn	PHlai	PBe	PNT	PC/SWT
*c-	*tç^{h}	(*c)	(*c)	(*c)
*-c-	*tç^{h}	(*c)	(*c)	(*c)
*s-	*s	(*s)	*s	*s
*-s-	*s	*d	*z	*z
*ç-	*s	*s	*s	*s
*-ç-	(*s)	(*d)	(*z)	(*z)

There is presently only one concrete example of *c; two others are possible:

(26) Reflexes of *c

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
one	*esa	*əca	*tç^{h}ɯ:	---	---	---
snail	[*sisi]	*[c]i[c]i	*tç^{h}i:	---	---	---
sip	*sepsep	*[c]əp[c]əp	*tç^{h}ɯp	---	---	---

As stated above, the palatal fricative *ç appears to have merged with *s in Kra-Dai. Reflexes of *s are given in (27), followed by the sole example of *ç in (28)[10]:

(27) Reflexes of *s

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
blow the nose	[*eseŋ]	*əsəŋ	---	---	*saŋh	*saŋh
sour	[*-sem]	*-[s]əm	---	---	*somʔ	*somʔ
insert, thread a needle	*-suk	*-[s]uk	*sok	---	---	---
wash (clothes)	*baseq	*ba[s]əq	*sɯ:k	*dak	*zak	*zak

(28) Reflexes of *ç

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
2sg, 2pl	*iSu	*içu	*səw	*su	*su:	*su:

2.4.2 The palatal lateral

The palatal lateral *ʎ merged with *l in Kra-Dai (see also section 2.3.2 above):

[10] See also RAn *ɖuça 'two', Proto Kra *sa 'id' (Ostapirat 1999).

Table 9: Correspondences for initial and medial *ʎ

RAn	PHlai	PBe	PNT	PC/SWT
*ʎ-	*hl	*l	*l	*l
*-ʎ-	*C-l	*l	*l	*l

Examples are given below:

(29) Examples of *ʎ

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
child	*aNak	*aʎak	*hlɯ:k	*lɯk	*lɯk	*lu:k
hear, listen (PF)	*tumaNa	*tumaʎa	*p-lɯ:	---	---	---
fish scale	*quSeNap	*quçəʎaf	*C-lə:p	---	(*kle[p/c])	(*klit)
to skin, peel	*-NiC	*-ʎiʈ	*hli:t	---	---	---
bee, wasp	*waNu	*waʎu	*p-lu:	---	---	---

Note that the frequently cited comparison between RAn *daʎum '(fresh)water' and Kra-Dai 'water' (PTai *C-namʔ, PBe *na:mʔ, PHlai *C-nəm) is incorrect; the correct comparison should be with Proto Formosan *tənəm 'sea'.

2.4.3 The effects of palatal consonants on vocalic nuclei

Palatal consonants appear to have raised the low and mid central vowels *a and *ə, whether they preceded them (30) or followed them (31):

(30) Effects of initial palatals on vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
one	*ə[ca]	*tɕ^{h}ɯ:	---	---	---
sip	*[c]əp[[c]əp]	*tɕ^{h}ɯp	---	---	---
borrow	*çə[ɟam]	---	---	---	*ʔjɯ:m
child	*a[ʎak]	*hlɯ:k	*lɯk	*lɯk	*lu:k
hear, listen (PF)	*tu[maʎa]	*p-lɯ:	---	---	---
fish scale	*quçəʎaf	*C-lə:p	---	(*kle[p/c])	(*klit)
moon	*buɻaʎ[11]	(*C-ɲa:n)	---	*ɓlɯən	*ɓlɯən

The RAn word *gaɲ 'eat, feed' is reconstructed with a palatal final based on both the traditional PAn reconstruction *kaen, in which the schwa (represented by *–e-*) is taken as evidence for the centralizing effect of the following *-ɲ, as well as Proto Oceanic *kani, in which the final vowel is analyzed as excrescent from the preceding palatal nasal[12]:

(31) Effects of final palatals on vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
eat, feed	*gaɲ	*k^{h}ən	*kən	*kɯɲ	*kin
old (living things)	*tuqaç	---	---	*ke:h	*ke:h

2.5 Kra-Dai velars and uvulars

2.5.1 Kra-Dai velar and uvular stops

Due to the initial devoicing described above, Kra-Dai *k and *g have merged in initial position, but are distinguished in medial position:

[11] 'Moon' is included here under the hypothesis that the laterals have metathesized to *buʎaɻ.
[12] For another example of this excrescent vowel, see RAn *çəpac 'four', POc *pati 'id'.

Table 10: Correspondences for initial and medial *k and *g

RAn	PHlai	PBe	PNT	PC/SWT
*k-	*k^{h}	*k	*k	*k
*-k-	*k^{h}	*k	*k	*k
*g-	*k^{h}	*k	*k	*k
*-g-	*ɦ, *k	*g	*ɣ	*ɣ

Examples of *k and *g are given below:

(32) Examples of *k

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
bite	*-ket	*-kət	---	---	*kat	*kat
catch	[*cikep]	*cikəp	---	---	---	*cap[13]
hold in cupped hands	[*ra(ŋ)kup]	*ra(ŋ)kup	*k^{h}op	*kup	---	*ko:p
cover	*-kup, *-kub	*-kup, *-kub	*k^{h}op	---	---	---
choke	[*cekel]	*cəkəl	*k^{h}ə:nʔ	---	---	---
tough, sticky	*-keC	*-kəʈ	*k^{h}a:t	---	---	---

(33) Examples of *g

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
eat, feed	*kaen	*gaɲ	*k^{h}ən	*kən	*kɯɲ	*kin
1sg	*(a)ku	*(a)gu	*ɦu:	---	*ku:	*ku:
elbow	[*siku]	*sigu	*Ciɦu:ŋɦ	---	---	---
dirty sweat	*daki	*dagi	(*k^{h}i:)	---	*ɣi:	*glaj
thick, viscous	[*buket]	*bu[g]ət	---	*gat	---	---
vagina (F)	*puki	*fugi	---	---	---	*hi:

RAn *k and *q nearly merged in initial position, although they are apparently distinguished in PC/SWT through aspiration in at least some instances. They can be distinguished easily in medial position: although there is variation in the PC/SWT reflexes of *-q- below, they are generally the same as those of intervocalic *-g-, and it appears that *-q- in Kra-Dai underwent intervocalic voicing to *-ɢ- before merging with *-g-.

Table 10: Correspondences for initial and medial *q and *ɢ

RAn	PHlai	PBe	PNT	PC/SWT
*q-	*k^{h}	*k	*k	*k$^{(h)}$
*-q-	*ɦ	*g	*ɣ	*ɣ
*g-	*k^{h}	*k	*k	*k
*-g-	*ɦ, *k	*g	*ɣ	*ɣ

Examples of initial and medial *q and *ɢ are given below:

[13] This form assumes vocalic transfer of the high vowel *i and subsequent palatalization of *k: *cikəp v *kjəp v *cəp v *cap.

(34) Examples of *q

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
old (living things)	*tuqaS	*tuqaç	---	---	*ke:h	*ke:h
scratch (mark)	*kur(e)qit	*kur(ə)qit	(ɦɯ:t)	---	---	*k^{h}i:t
thigh, leg	*paqa	*paqa	*ɦa:	(*wa:)	(*k^{w}a:)	*xa:
excrement	*Caqi	*ʈaqi	*ɦa:jʔ	*ga:jʔ	*ɣajʔ	(*k^{h}i:ʔ)
carrying pole	*pasaqan	*pasaqan	---	---	*ɣa:n	*ga:n
to throw	[*buqaŋ]	*buqaŋ	---	---	---	*ɣ^{w}aaŋh

(35) Examples of *ɢ

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
ribs	*tageRaŋ	*taɢəʀaŋ	*k^{h}a:ŋʔ	---	---	*k^{h}ra:ŋʔ
hold in fist	*gemgem	*ɢəmɢəm	---	---	*kam	*kam
high-pitched sound, whinny	[*egik]	*əɢik	*ki:k	---	---	---
fence, field dike	[*pager]	*paɢər	*Ciɦə:n	---	*ɣal	*ɣan

2.5.2 Kra-Dai *ʀ

The most common reflexes of RAn *ʀ in Kra-Dai are given below:

Table 11: Correspondences for initial and medial *ʀ

RAn	PHlai	PBe	PNT	PC/SWT
*ʀ-	*r	(*h)	*hr	*h
*-ʀ-	*r	*ʃ	*r	*^{h}r

*ʀ often appears as a rhotic in initial and medial position:

(36) Examples of *ʀ

Gloss	PAn	RAn	PHlai	PBe	PNT	PC/SWT
dry, withered (PF)	*qaRiw	*qaʀiw	---	*ʃ[o]:	*hriəw	*hiəw
indigo (grass)	*CaRum	*ʈaʀum	---	---	*hro:mʔ	*[h/s]o:mʔ
taro	*biRaq	*biʀaq	*ra:k	*ʃa:k	*prɯək	*p^{h}rɯək
give	[*beRay]	*bəʀaj	---	*ʃe:	---	---
cut, reap (PF)	*keRet	*kəʀət	*rət	---	---	---
wait	*taRah	*taʀah	---	---	*ʧ^{h}a:ʔ	*t^{h}a:ʔ
ribcage	*tageRaŋ	*taɢəʀaŋ	*k^{h}a:ŋʔ	---	---	*k^{h}ra:ŋʔ

Although the Tai reflexes of 'wait' don't provide direct evidence for a rhotic, it can be inferred based on a similar comparison with PHlai for the form 'ask': PC/SWT *t^{h}aa:m, PNT *ʧ^{h}a:m, PHl *ra:m < *təra:m < *təʀam.

In final position, *ʀ appears to be one source of Kra-Dai tone category B:

(37) Examples of final *ʀ

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
spurt (from mouth)	*buʀəç	*p^{h}uɦ	---	---	---
spring, well	*təbuʀ	---	---	*ɓo:h	*ɓo:h
shoulder	*qabaʀa	*ʋa:ɦ	*C-biaʔ	*C-ba:h	*ɓa:h
snake	*çulaʀ	*lja:ɦ	---	---	---

2.5.3 The effects of uvular consonants on vocalic nuclei

Uvular consonants tended to have a lowering effect on high vowels; they promoted breaking of *i and the lowering of *u:

(38) Effects of uvulars on high vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
excrement	*ʈaqi	*ɦa:jʔ	*ga:jʔ	*ɣajʔ	(*k^{h}i:ʔ)
dry, withered (PF)	*qaʀiw	---	*ʃ[o]:	*hriəw	*hiəw
indigo (grass)	*ʈaʀum	---	---	*hro:mʔ	*[h/s]o:mʔ
pound	*-tuɢ	---	---	*to:k	*to:k
fall	*-tuq	*t^{h}ok	*tɔk	*tok	*tok
spring, well	*təbuʀ	---	---	*ɓo:h	*ɓo:h
spurt (from mouth)	*buʀəç	*p^{h}uɦ	---	---	---

Uvulars did not appear to affect non-high vowels:

(39) Effects of uvulars on non-high vowels

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
hold in fist	*ɢəmɢəm	---	---	*kam	*kam
fence, field dike	*paɢər	*Ciɦə:n	---	*ɣal	*ɣan
cut, reap (PF)	*kəʀət	*rət	---	---	---
wash (clothes)	*ba[s]əq	*sɯ:k	*dak	*zak	*zak
hit, play	*-təɢ	---	---	*tɯk	*tɤk
thigh, leg	*paqa	*ɦa:	(*wa:)	(*k^{w}a:)	*xa:
carrying pole	*pasaqan	---	---	*ɣa:n	*ga:n
to throw	*buqaŋ	---	---	---	*ɣ^{w}a:h
taro	*biʀaq	*ra:k	*ʃa:k	*prɯək	*p^{h}rɯək
give	*bəʀaj	---	*ʃe:	---	---
wait	*taʀah	---	---	*tʃ^{h}a:ʔ	*t^{h}a:ʔ
ribcage	*taɢəʀaŋ	*k^{h}a:ŋʔ	---	---	*k^{h}ra:ŋʔ
mouth	*baqbaq	---	*pa:k	*pa:k	*pa:k
shoulder	*qabaʀa	*ʋa:ɦ	*C-biaʔ	*C-ba:h	*ɓa:h
snake	*çulaʀ	*lja:ɦ[14]	---	---	---

The two PTai exceptions above are ‘hit, play’ and ‘taro’. The centralization of the vowel in the latter was due to the influence of the preceding *i. Other examples of this include the following:

(40) Centralization of PTai *a: after *i

Gloss	PHlai-Tai	PHlai	PBe	PNT	PC/SWT
gadfly	*Cila:k	*lja:k	---	*hlɯək	*hlɯək
yellow	*Cila:ŋ	*lja:ŋ	*C-la:ŋ	---	*hlɯəŋ
bedbug	*Ci[l]a:t	---	*rjat	*rɯət	*l̥ɯət

There are three examples in the present dataset of RAn high vowels corresponding with Kra-Dai mid vowels with no influence from uvular consonants:

[14] The initial *lj- in this PHlai form might be explained via coloring of the first vowel by the initial *ç- and subsequent vocalic transfer: *çulaʀ > *çilaʀ > *çəljɑ:ʀ > *ljɑ:ɦ.

(41) Kra-Dai mid vowels not conditioned by uvular consonants

Gloss	RAn	PHlai	PBe	PNT	PC/SWT
hold in cupped hands	*ra(ŋ)kup	*k^{h}op	*kup	---	*ko:p
small, child	*kə[d]i(k)	*ɗiʔ	---	*ɗek	*ɗek
fart	*qətut	*t^{h}u:[t/c]	*tot	(*hroc)	*tot

There doesn't seem to be a straightforward explanation for these if one assumes an original four vowel system in the parent of Austronesian and Kra-Dai. However, if a six vowel system is assumed (which includes *e and *o), then some Kra-Dai mid vowels may be assumed to be original while *e and *o raised to *i and *u in Pre-Austronesian. More research, including a full reconstruction of Proto Kam-Sui, Proto Kra and ultimately Proto Kra-Dai, is required for a more satisfactory solution.

3.0 Austroasiatic Evidence

Given the Austronesian-Kra-Dai distinctions evidenced above, and the support for Benedict's Austro-Tai (AT) hypothesis which they imply, the question arises as to whether any of the same distinctions occur in Austroasiatic in support of Schmidt's Austric hypothesis (Schmidt 1906) later defended by Shorto (1976). In order to explore this question, a set of Austro-Tai[15]-Austroasiatic comparisons have been assembled using the lexical database at the SEAlang Mon-Khmer Languages Project (http://sealang.net/monkhmer/dictionary/).

Since reconstruction of Proto Austroasiatic is an ongoing project, Proto Mon-Khmer (Shorto)[16] data is cited along with several branch-level reconstructions: Proto Vietic (Ferlus), Proto Monic (Diffloth), and Proto Bahnaric, Proto Katuic, Proto Khmuic, and Proto Palaungic (all reconstructed by Sidwell). Although many of these comparisons have been suggested elsewhere in the literature, some are suggested here for the first time. Not all of them may end up proving valid, but as with the Austronesian-Kra-Dai comparisons above, an attempt has been made to control for both semantic and phonological plausibility. In some cases, there are also potential comparisons with Old and Middle Chinese (Baxter & Sagart 2011); these are footnoted where appropriate.

*3.1 Austro-Tai *p and *f*

There does not appear to be any clear indication in Austroasiatic for the *p and *f distinction:

Table 12: Reflexes of An-KD *p and *f in Austroasiatic

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*p	*p	*p	---	---	---	*p	---
*f	*p	*p	*p	*p	*p	*p	*p

Examples are given below. For practical reasons, they are split between comparisons with Austronesian and Kra-Dai respectively; there are some for the same etyma:

(42) RAn *p

Gloss	RAn	PMK	PPal
fathom	*dəpa	---	(*təp)
pinch	*qapit	*pi[:]t	*piət
fold	*ləpət	*[l]pət	*pat
knife	*pisaw	*pi[:]s	---

[15] For the sake of convenience Austronesian-Kra-Dai etyma and reflexes will be labeled 'Austro-Tai (AT)' when being compared with Austroasiatic (Aa) from this point on.

[16] I make one revision to Shorto's PMK vocalism, in that I replace his diphthong *ai with *ɛ:.

(43) KD *p

Gloss	PBe	PNT	PC/SWT	PMK	PViet
shell, bark	*pa:wʔ	---	---	---	*-pɔh
to peel[17]	---	*po:k	*po:k	*pɔ:k	---

(44) RAn *f

Gloss	RAn	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
heart	*fu[ç]uq	*pu:s	---	---	---	---	---	---
bait	*faniŋ	---	---	*pran	---	---	---	*pran
paddy	*faḍaj	*prleʔ	---	---	---	*prleʔ	---	---
lime	*qafuʀ	*kmpur	*kpu:r	---	*kmbo:r	---	---	---
tortoise	*qaṭi[f]a	*$t_1$paʔ	---	*tpa:	*tpa:	*tmpaʔ	---	---
sweep	*caf[i/u]h	*$t_2$pu:s	---	*po:s	*po:s	*pəs	*pi:s	---
tooth	*-ifən	---	---	*p[ɨ/ə]ŋ	---	---	*piəŋ	---
centipede	*qa⌊uçifan	*kʔi[:]p	---	*kʔe:$_3$p, *kɟe:$_3$p	*kahe:p	*kʔi:p	*sʔi[i]p	---

(45) KD *f

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PBahn	PKat	PKhm
tortoise	---	---	*fuə[ʔ]	*fa:	*t1paʔ	*tpa:	*tpa:	*tmpaʔ

Note that there may be a sporadic tendency for Austro-Tai *-f- to correspond with Austroasiatic *-mp- in medial position:

(46) AT *-f- and Aa *-mp- in medial position

Gloss	RAn	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PKhm
lime	*qafuʀ	---	---	*kmpur	*kpu:r	---	*kmbo:r	---
tortoise	*qaṭi[f]a	*fuə[ʔ]	*fa:	*$t_1$paʔ	---	*tpa:	*tpa:	*tmpaʔ

3.2 Austro-Tai retroflex consonants

3.2.1 Austro-Tai *t and *ṭ

There is no distinction in Austroasiatic between *t and *ṭ. Potential etymological connections between Austro-Tai and Austroasiatic have the same reflexes for both series:

Table 13: Reflexes of AT *t and *ṭ in AA

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*t	*$t_{[1]}$	*t	*t	*t	*t	*t	*t
*ṭ	*$t_{[1]}$	---	*t	*t	*t	*t	*t

(47) RAn *t

Gloss	RAn	PMK	PBahn	PKhm	PMon
hit, play	*-təɢ	*[ɟ]tə:k	---	*tɛk	*tak
pierce	*təbək	*t_1[ə/a]p	---	*tap	---
burst	*bətuʔ	*bt$_1$u[ə]h	*ptoh	---	---

[17] MC 剝*pæwk

(48) KD *t

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKhm	PPal	PMon
tie; wrap	*tʰuːk	*tuk	---	---	*tɩu[ː]k	---	---	*tuk	*tuk	---
hit	*tʰa[ː]jɦ	---	---	---	*tɩeh	---	---	---	---	---
boil	---	---	*tumh	*tomʔ	*tɩu[ə]m	---	---	---	---	*tɔːm
pound	---	---	*tam	*tam	*təm	---	---	---	---	---
warn	---	---	*tɯən	*tɯən	*tɩ[e][r]	---	---	---	---	---
hit, play	---	---	*tɯk	*tɤk	*[ɻ]təːk	---	---	*tɛk		*tak
wasp	---	---	*toːh	*toːh	---	*ptɔː	---	---	---	---
erect	---	---	*taŋʔ	*taŋʔ	---	---	*taŋ	---	---	---
wake up	---	---	(*hrɯnh)	*tɯːnh	---	---	---	---	---	*[k]təːr

(49) RAn *ʈ

Gloss	RAn	PMK	PBahn	PKat	PKhm	PMon
eye	*maʈa	*mat	*mat	*mat	---	*mat
tortoise	*qaʈi[f]a	*tɩpaʔ	*tpaː	*tpaː	*tmpaʔ	---
rope	*ʈa[ɭ]iç	*tɩrliʔ	---	---	---	---
that	*-ʈu	*təʔ	*tɔː	---	---	---
vomit	*u[ʈ]aq	*[s]taʔ	---	*kta:[ʔ]	---	*taːʔ
arrive	*ʈəkas	---	---	*tək	---	---

(50) KD *ʈ

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PBahn	PKat	PKhm	PPal	PMon
eye	*ʈʃʰaː	*taː	*p-taː	*p-tʰraː	*mat	*mat	*mat	*mat	---	*mat
grandfather	*ʈʃʰaːʔ	---	*taː	*taː[18]	---	---	---	*taʔ	*taːʔ	---
buy; sell	*ʈʃʰəc	---	---	---	*tɩac	*tac	*tac	*tac	*təc	---
hot	*ʈʃʰwəwʔ	---	---	---	*ktuːʔ	*toʔ	*ʔatoʔ	---	---	*kmtaw
expose to sun	*ʈʃʰiːŋʔ	---	---	---	---	*tiːŋ	*tiːŋ	---	---	---

3.2.2 Austro-Tai *ɖ

There are not enough potential cognates with Austro-Tai *ɖ to establish correspondences in Austroasiatic with any certainty; the few that have been found are given below:

(51) RAn *ɖ

Gloss	RAn	PMK	PViet	PKhm
foam	*buɖaq	---	*bɔːt	---
paddy	*faɖaj	*prleʔ	---	*prleʔ

(52) KD *ɖ

Gloss	PHlai	PNT	PC/SWT	PMK	PKat	PPal
wart	(*suːc)	*ɖuːt	(*soːt)	*ktɩuut	*ktɔːt	toːt

3.2.3 Austro-Tai *l and *ɭ

Unlike the retroflex stops, there may be tentative evidence for a distinction between *l and *ɭ in Austroasiatic:

[18] One explanation for the conflicting correspondence between PHlai *ʈʃʰɑːʔ (< *ʈɑːʔ) and PTai *taː may be that the PTai form is a backloan from an Austroasiatic source.

Table 14: Reflexes of AT *l and *l̥ in Aa

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*l	*l	*l	*l	*l	*l	*(h)l	*l
*l̥	*rl	---	*l	*r[l]	*l	---	*l

Examples of Austro-Tai *l are given below:

(53) RAn *l

Gloss	RAn	PMK	PBahn	PKat
swallow[19]	*tilən	*lu[:]n	*luən	*ləːn
roll	*luluʎ	*luːn	---	---
fold	*ləpət	*[l]pət	---	---
sink[20]	*-ləm	*lə[:]m	---	---
buy	*bəli	---	---	*bləj

(54) KD *l

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
swallow	---	*C-l[ua]n	*klɯːn	*klɯːn	*lu[:]n	---	*luən	*ləːn	---	---	---
banana	---	---	*kluəjʔ	*kluəjʔ	*$t_1$luəjʔ	---	---	---	*tlɔːj	*klɔːj	---
drum	*C-ləŋ	*C-loŋ	*kloːŋ	*kloːŋ	---	---	---	---	---	*kruŋ	---
roll	*C-lun	---	---	---	*luːn	---	---	---	---	---	---
blind	---	*C-lak	---	---	*klak	---	---	---	*lək	---	---
sickle[21]	*C-liːm	*liːm	---	*liːm	---	*liɛm	---	---	---	---	---
water leech	*ljiŋ	---	*pliŋ	*pliŋ	---	*pliːŋ	---	---	---	---	---
release		---	---	*ploːjh	---	*prəːjʔ	*ləːj	---	---	---	---
buy, exchange	*p-ləj	---	---	---	---	---	---	*bləj	---	---	---
spread out	*p-laːɦ	---	---	---	---	*praːs	---	---	---	*plaːs	*laːs
to cover	*p-lom	---	---	---	---	---	---	*-lum	---	---	*[d/g]rlum
destroy	---	---	---	*mlaːŋʔ	*la[:]ŋ	---	---	---	---	---	---
look, see	*ljuːjʔ	---	---	*leː	---	---	---	*taloːj	---	---	---
lick	*ljiːmɦ	*liːmʔ	---	---	*[c]li[ə]mʔ	*-lɛːm	---	---	---	---	---
take off	*ljaːwɦ	---	---	---	---	---	*[p/b]loh	*luoh	---	---	---
sink, drown	*hlom	---	*hlomh	*hlomh	*lə[:]m	---	---	---	---	---	---
deaf	*hləːk	---	---	---	---	---	*klɨk	---	---	---	---
clear	*hlɯːŋʔ	(*daːŋʔ)	---	---	---	*klɔːŋ	*sla[:]ŋ	*-laŋ		*plaːŋ	---
iron[22]	---	---	---	*hlek	---	---	---	---	---	*hlek	---
stake (n)	---	---	*hlak	*hlak	---	---	---	---	---	*hlaʔ	---
sharp-pointed	---	---	*hleːm	*hleːm	*[r]l[ɛː]m	---	---	---	---	*lam	---
betel	---	---	*bluː	*bluː	*ml[əw]	*bluː	*b(ə)luː		*bluː	*bləw	*[s]abluːʔ
slip and fall	---	---	*blaːt	*blaːt	---	*blaːt	---	---	---		---
crawl	---	*[r]ɯːn	*l̥ɯən	*glaːn	---	*-liəŋ	---	---	---	*glan	---
rinse, wash	---	---	*l̥ɯəŋʔ	*laːŋʔ	*laːŋʔ	---	---	---	---		---
swim, float	---	---	---	*loːj	*luːj[ʔ]	---	---	*loːj	*luːj	*hloːj	---
surround	---	---	---	*loːm	---	---	---		*rɔːm		---

Examples of Austro-Tai *l̥ are given below. It is possible that it is distinguished from *l in medial position:

[19] OC 吞 *l̥^{ɕ}ən
[20] OC 沈 *l̥rəm

[21] MC 鐮 *ljem
[22] OC 鐵 *l̥^{ɕ}ik

(55) AT *l̥

Gloss	RAn	PHlai	PNT	PC/SWT	PMK	PBahn	PKat	PKhm	PMon
rope	*ʈal̥iç	---	---	---	*t$_1$rliʔ	---	---	---	---
sesame	*l̥əŋa	*hŋɯ:	*ŋra:	*ŋa:	---	*lŋa:	---	*lŋaʔ	*lŋaw
to plant	*mul̥a	---	---	---	---	*ɟmu:l	---	*ɟmɔ:l	---
forest	*ça l̥as	---	---	---	---	---	*ʔariː s	---	---
run	---	*Curu:ɦ	---	---	---	---	*trluh	---	---

This is strengthened by the addition of the form ‘paddy’ to this set, under the assumption that medial *ɖ̥ lenited to *l̥:

(56) AT *ɖ̥/*l̥: Aa *-rl-

Gloss	RAn	PHlai	PMK	PKat	PKhm
paddy	*faɖ̥aj	---	*prleʔ	---	*prleʔ
rope	*ʈal̥iç	---	*t$_1$rliʔ	---	---
run	---	*Curu:ɦ	---	*trluh	---

There is also one example of a mixed correspondence between Proto Tai and Austroasiatic:

(57) KD *l: Aa *r

Gloss	PNT	PC/SWT	PMK	PBahn	PKhm	PMon
coconut	*bla:wʔ	*bla:w[h/ʔ]	*bra:w	*bra:w	*b[l/r]a:w	*bra:w

3.3 Austro-Tai palatal consonants

3.3.1 Austro-Tai *c, *s and *ç

Although the number of comparable forms is fairly small, there does seem to have been a distinction between AT *c, *s and *ç in Austroasiatic:

Table 15: Reflexes of AT *c, *s and *ç in Aa

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*c	*c	*c	*c	*c	*c	*c	---
*s	*s	*s	*s	---	*s	*s	*s
*ç	*s, *ʔ, *c	---	*s, *ʔ	*s, *h, *ʔ	*ʔ	*s, *ʔ	*s

While there are no known Austronesian witnesses which could distinguish between *c and *s in the form ‘dog’, if related, the Austroasiatic evidence suggests the former:

(58) AT *c

Gloss	RAn	PBe	PC/SWT	PMK	PViet	PBahn	PKat	PKhm	PPal
dog	*a[c]u	---	---	*cɔʔ	*ʔacɔːʔ	*cɔ:	*ʔacɔ:	*cɔʔ	*cɔʔ
to tear	---	*ʃek	*c^{h}i:k	*cri:k	---	---	---	---	---

(59) AT *s

Gloss	RAn	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKhm	PPal	PMon
knife	*pisaw	---	---	---	*pi[:]s	---	---	---	---	---
heart	*fu[s]uq	---	---	---	*puːs	---	---	---	---	---
heart[23]	---	*sem	*sim	*sim	---	*seːmʔ	---	---	---	---
string	---	---	*saːj	*saːj	---	---	*k-sɛː	*seʔ	*siʔ	---
high, tall	---	---	---	*suːŋ[24]	*slu[:]ŋ	---	---	---	---	*sloːŋ

(60) RAn *ç

Gloss	RAn	PMK	PBahn	PKat	PKhm	PPal	PMon
hair[25]	*buçək	*su[:]k	*sɔk	*sok	---	*suk	*sɔːk
scale	*quçəʎap	*krcaːp	---	---	---	---	---
tie	*çigət	*[c]kat	*kət	---	---	---	---
centipede	*qaɭuçifan	*kʔi[:]p	*kʔeː$_3$p, *kɟeː$_3$p	*kaheːp	*kʔiːp	*sʔi[:]p	---
forest	*çaɭas	---	---	*ʔariːs	---	---	---
rope	*ʈaɭiç	*t$_1$rliʔ	---	---	---	---	---

(61) KD *ç

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PBahn	PKat	PKhm	PPal
centipede	(*ɾiːp)	*rep	(*sip)	*k^{h}rep	*kʔi[:]p	*kʔeː$_3$p, *kɟeː$_3$p	*kaheːp	*kʔiːp	*sʔi[:]p

The fact that there are multiple reflexes is suggestive of a borrowing scenario, where Austroasiatic *s and *c represent earlier forms (either inherited or borrowed), and those with glottal reflexes (*h and *ʔ) are later borrowings. However, since the comparisons above are rather tentative at this point, further analysis is difficult.

3.3.2 Austro-Tai *l and *ʎ

Austro-Tai *l and *ʎ appear to have merged:

Table 16: Reflexes of AT *l and *ʎ in Aa

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*l	*l	*l	*l	*l	*l	*(h)l	*l
*ʎ	*l	---	---	*l	---	---	---

(62) AT *ʎ

Gloss	RAn	PHlai	PMK	PKat
peel	*-ʎiʈ	*hliːt	---	*-liət
swim	*ʎaŋuj	---	*[l]ŋuj	---
roll	*luluʎ	---	*luːn	---

The one exception is in the PMK form ‘roll’, which has a nasal final reminiscent of the shift which occurred in Proto Malayo-Polynesian from *ʎ to *n.

[23] MC 心*sim

[24] The form for ‘high, tall’, if connected to the Aa forms, is a rare example of prefix preemption in Tai.

[25] This comparison of the Austronesian and Austroasiatic forms for ‘hair’ rests on the assumption of vocalic metathesis in one of the two phyla.

3.4 Austro-Tai velars and uvulars

3.4.1 Velar and uvular stops

The Austroasiatic reflexes of the Austro-Tai velar and uvular stops are reminiscent of Kra-Dai, in that the uvular series has merged with the velar series, and voiced stops have devoiced. Unlike Kra-Dai, however, medial uvular stops have not undergone lenition:

Table 17: Reflexes of AT *k~*q and *g~*ɢ in Aa

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*k, *q	*k	*k	---	---	*k	*k	*k
*g, *ɢ	*k	*k	*k	*k	---	*k	---

(63) RAn *k and *q

Gloss	RAn	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
bite	*-kət	*ki:t	*ka:t	---	---	*kɛ:t	---	*kɯt
scrape	*karut	*ku:t	---	---	---	*ku:t	---	---
cover	*-kup	*cku[:]p	---	---	---	---	---	---
ginger	*laqia	---	---	*kja:$_1$	---	---	---	---
centipede	*qaluçifan	*kʔi[:]p	---	*kʔe:$_3$p, *kɟe:$_3$p	*kahe:p	*kʔi:p	*sʔi[i]p	---
lime	*qafuʀ	*kmpur	*kpu:r	---	*kmbo:r	---	---	---
scale	*quçəʌap	*krca:p	---	---	---	---	---	---
lead (n)	*timəʀaq	*tra:k	---	---	---	---	*tra:k	---

(64) KD *k and *q

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
cover[26]	*k^{h}op	---	---	---	*cku[:]p	---	---	---	---	---	---
throat	*k^{h}ə:k	---	---	---	*kɔ[:]k	---	---	---	*kɔ:k	*ko:k	---
sword[27]	(*kɯ:mɦ)	*ki:mʔ	---	*ki:mh	---	*tkiəm	---	---	---	---	---
work[28]	---	*koŋ	*hoŋ	*koŋ	*kuŋ		---	---	---	---	---
bite	---	---	*kat	*kat	*ki:t	*ka:t	---	---	*kɛ:t	---	*kɯt
mustard green[29]	---	---	*ka[:]c	*ka:t	---	*ka:s	---	---	---	---	---
scrape	---	---	---	*xu:t	*ku:t	---	---	---	*ku:t	---	---
rice	---	---	*ɣawʔ	*k^{h}awʔ	*rk[aw]ʔ	---	---	---	---	---	---
bite	---	---	*ɣap	*k^{h}op	*ka[:]p	---	*kap	*kap	---	---	---

(65) RAn *g and *ɢ

Gloss	RAn	PMK	PBahn	PKat	PKhm	PPal	PMon
tie	*çigət	*[c]kat	*kət	---	---	---	---
elbow	*sigu	*kj[o]ŋ	---	---	---	---	---
1sg	*agu	---	---	*kəw	---	---	---
hold in closed hand	*ɢəm	*k[u]əm	---	---	---	*kəm	---
hit, play	*-təɢ	*[ɟ]tə:k	---	---	*tɛk	---	*tak

[26] OC 蓋 *k^{ʕ}ap-s
[27] MC 劍 *kjæmH
[28] OC 工 *k^{ʕ}oŋ
[29] OC 芥 *k^{ʕ}ret-s

(66) KD *g and *ɢ

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PPal
edge	*ki:ŋ	---	---	---	*ɟki:[ŋ]	*ɟki:[ŋ]	*ɟkiə[ŋ]	---	---
tight	*kɯŋ	*kəŋ	---	---	---	---	---	---	*kəŋ
bury	*kom	---	---	---	---	*kəmʔ	---	---	---
1sg	*ɦu:	---	*ku:	*ku:	---	---	---	*kəw	---
hold	---	---	*kam	*kam	*k[u]əm	---	---	---	*kəm
elbow	*Ciɦu:ŋɦ	---	---	---	*kj[o]ŋ	---	---	---	---
branch	*Cuɦinɦŋ	---	*ki:ŋh	*kiŋh	*kiəŋ	---	---	---	---
chin	*ɦa:ŋ	*ŋa:ŋ	*ɣa:ŋ	*ga:ŋ	*ka:ŋʔ	*ka:ŋʔ	*ka:ŋ	---	---
penis	---	---	---	*gwaj	*kləjʔ	---	---	*klɛ:	*kleʔ
throat[30]	---	*go:	*ɣo:	*ɣo:	*kɔʔ	*koh	*kɔ:ʔ	---	---
dove	*k^{h}u:	*gu:	---	---	---	*tku:	---	---	---
tie	---	*gat	---	---	*[c]kat	---	*kət	---	---

There are a few forms in which reflexes of Kra-Dai *g correspond with Austroasiatic *g:

(67) KD *g and Austroasiatic *g

Gloss	PHlai	PBe	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PPal
step	*ɦa:mɦ	---	---	---	*ga:m	---	---	---	---
hold in jaws	---	---	*ga:p	*ga:p	---	*ga:p	---	---	---
handle	---	---	*gal	*gan	---	---	---	*gir	---
tie	---	*gat	---	---	*[]gat	---	(*kət)	---	---
3sg	---	*gə	---	---	---	---	---	---	*gə:ʔ

3.4.2 The uvular rhotic

Austro-Tai *ʀ (or *-ʀ clusters) nearly always correspond with Austroasiatic *r:

Table 18: Reflexes of AT *ʀ in Aa

AT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
*ʀ	*r	*r	*r	*r	*r	*r	*r

(68) RAn *ʀ

Gloss	RAn	PMK	PBahn	PKat	PKhm	PPal
hibiscus	*baʀu	*cba:r	---	---	---	---
lead (n)	*timəʀaq	*tra:k	---	---	---	*tra:k
to moan	*-ʀəŋ	---	*-riŋ	---	---	---
left	*wiʀi	---	---	*ʔawiar	*wiʔ	*w[e/ɛ]ʔ

(69) KD *r

Gloss	PHlai	PBe[31]	PNT	PC/SWT	PMK	PViet	PBahn	PKat	PKhm	PPal	PMon
swim	---	*raj	---	---	---	---	*rɛ:	---	---	---	---
edge	---	---	*rim	*rim	*ri[:]m	---	---	---	---	*ri:m	*gnrəm
track	---	---	*ri:	*ro:j	*ru[ə]j	---	---	---	---	---	---
receive	---	---	*rap	*rap	---	---	---	*ra[:]p	---	---	---
love	---	(*də:k)	---	*rak	*r[a]k	---	---	---	*rak	*rak	---
fight	---	---	---	*rop	*rup	---	---	---	*rup	---	---
hundred	---	---	*ro:jʔ	*ro:jʔ	---	---	---	---	---	*rɔ:j	---
to lead	*rujʔ	---	---	---	---	---	*-rɔ:j	---	---	---	---
prepare	*rəp	---	---	---	---	---	*-rap	[ta]rap	---	---	---
rhinoceros	---	---	*re:t	*re:t	*sri:t	---	---	---	---	---	---

[30] OC 喉*g^{ʕ}o

[31] PBe *ʃ- is the regular reflex of Kra-Dai *Cr- clusters.

squirrel	---	---	*ro:k	*ro:k	*prɔ:k	*prɔ:k	*prɔ:k	*prɔ:ʔ	*prɔ:k	---	---
cricket	---	---	---	*[r]it	*[tɻ/c]ri:t	---	---	*ʔariet	---	*ri:t	---
gnat	---	---	---	*ri:nʔ	---	---	---	---	*trəɲ	---	---
river	---	---	---	*ro:ŋh	*ru[:]ŋ	*kro:ŋ	*krɔ:ŋ	rɔ:ŋ	---	*rəŋ	*kro:ŋ
shrink	---	*ʃot	*hrot	*t^{h}rot	---	---	*-ro:t	---	*hwuət	*ru:t	---
disappear	---	---	*hruəj	*t^{h}ra:j	---	---	---	---	---	*hra:j	---
tear	---	*ʃek	---	*c^{h}i:k	*cri:k	---	---	---	---	---	---
to bark	---	*ʃa:wʔ	*hrawh	*hawh	---	*krəh	---	*kroh	---	*rəh	---
cage[32]	---	---	---	*hroŋh	*tru[:]ŋ	(*kɗɔ:ŋʔ)	*krɔ:ŋ	*taruŋ	---	---	---
forest	*rəŋ	---	---	---	---	*krəŋ	---	---	---	---	---
pepper	---	---	---	*brik	---	---	---	*brik	---	---	---
machete	---	---	*ɟra:ʔ	*bra:ʔ	---	---	*bra:	*bra:	*bra:	---	*mra:ʔ
banyan	*ri:	---	*raj	*raj	---	*ɟri:	*ɟri:	*ɟari:	---	---	*ɟrəj

3.5 Summary of the Austroasiatic evidence

Unlike the case of Austronesian and Kra-Dai, in which evidence for the proposed consonants *f, *t̪, *l̪, *c and *g is mutually corroborative and indicative of a genetic relationship, the comparisons above between Austro-Tai and Austroasiatic are more complex. The Austroasiatic data tenuously support the distinctions between *c, *s, and *ç; this is also true for *-f- and *-l̪- in medial position, although reflexes of medial *-f- as Austroasiatic *-mp- are sporadic.

Although it is probable that at least a few of the comparisons above will eventually be shown to be chance resemblances, the cumulative weight of the data, as in the case of the Austronesian-Kra-Dai comparisons, suggests a non-accidental relationship between Austro-Tai and Austroasiatic. However, at the present stage of research, it is not as easy to establish whether these correspondences should be attributed to genetic relationship or to contact.

If Austro-Tai and Austroasiatic are in fact genetically related, this would explain the widespread distribution of some of the comparanda listed above. On the other hand, a contact scenario would explain the sporadic reflexes of some posited proto phonemes (most notably AT *ç) as well as the apparent merger of some categories such as *t and *t̪; two possible explanations for this would be that they had either (a) already merged in the donor language at the time of borrowing or (b) that they were assimilated to the closest Austroasiatic category (for example, if Austroasiatic lacked an *f, then it would be natural to borrow Austro-Tai *f as *p).

6.0 Conclusion

The revision of the Proto Austronesian consonant inventory described in section one opens up new avenues in the comparison of Austronesian and Kra-Dai etyma. Besides creating a more symmetrical and phonetically plausible system in Proto Austronesian, it also offers the following insights:

1. Although cases of intervocalic lenition are common within the Kra-Dai phylum, not all cases of multiple reflexes need to be explained this way. Etyma which have been argued to result from lenition of *p and *k, for example, can now be traced back to an original *f or lenition of *g (parallel with the lenition of the other voiced stops).

2. Vocalic transfer is also common, but some instances of aberrant vocalism can now be explained via the place of articulation of the flanking consonants. Palatal consonants, for example, tend to raise low vowels, and uvular consonants lower high vowels, while retroflex consonants are correlated with centralization, at least in the case of the vowel *u.

3. While implosives appear to be reconstructible at the highest levels of both Austronesian and Kra-Dai, there is evidence that plain voiced stops became implosive secondarily in certain environments. This helps to explain cases of plain-implosive voiced stop mismatch in some correspondence sets.

[32] OC 籠 *k.r^{ˤ}oŋ[ʔ]

4. Finally, one source of the Kra-Dai tone category B (*-h) is final *-ʀ.

An exploratory comparison of the proposed parent of Austronesian and Kra-Dai (Austro-Tai) and Austroasiatic has also been undertaken. While the results are promising enough to support further investigation into this area as progress in the reconstruction of both phyla continues, further analysis is ultimately beyond the scope of the present paper.

The next crucial step in Austronesian and Kra-Dai comparison will involve the completion of the reconstruction of all high-level Kra-Dai branches and the ultimate reconstruction of the Proto Kra-Dai lexicon itself. The integration of this research program with related non-linguistic disciplines such as genetics, archaeology, and paleoclimatology is highly encouraged, as a more refined model of prehistory in Southeast Asia comes increasingly within reach.

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