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/a/ glide in Sino-Tibetan

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Abstract

The close vowels i, u, y are commonly reported in the world's languages to alternate with their semi-vocalic counterparts j, w, ɥ, in variation patterns conditioned by the position of the phoneme in the syllable.

Modern phonological theories have proposed, rather convincingly, the hypothesis of a unique gradient of sonority or consonanticity for all speech sounds. Such a hierarchical ordering would determine the syllabic structure of words and sentences from the sequence of phonemes in the speech chain.

Several Sino-Tibetan languages can be adduced to support this hypothesis, but there are a few problems and counter-examples.

With any version of a sonority hierarchy, a is considered the most vocalic, most sonorous, least consonantic of all speech sounds. Usually, in a syllable where a co-occurs with another vocalic sound, its presence drives the other vowel to a semi-vocalic or glide status, while a assumes the role of nucleus peak.

In several Sino-Tibetan languages however, a can leave the role of nucleus peak to a higher vowel, theoretically less well endowed with sonority.

The IPA provides symbols (and potential phonemic recognition) to four voiced approximants (palatal j, velar ɰ, labio-velar w, and labial-palatal ɥ). If the pertinence of the distinction between a as a vowel and a̯ as a non-nuclear element is confirmed, it might be necessary either to introduce a new symbol in the IPA for an 'a'-glide, phonetically in the area of a voiced uvular or pharyngeal approximant (and recognize its 'non-syllabic' feature as distinctive), or to accept the syllable structure as non-derived, or both.

In a substantial proportion of contemporary phonological theories, it is argued that segments are attached to templates or to syllabic or moraic nodes according to the principles of a sonority hierarchy which is basically the same for all authors. We can take Vennemann's model as typical of such a hierarchy (fig 1).

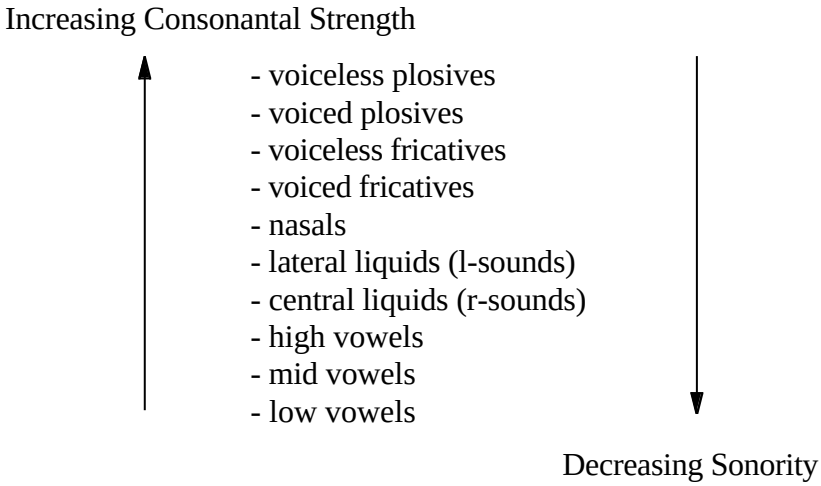

Fig. 1: Sonority hierarchy. (after Vennemann, 1988:9)

For those segments located towards the middle of the hierarchy — from nasals to high vowels — in languages which allow them to function either as consonants or as vowels, the determination of their status as syllabic peaks or as margins depends on the relative position on the sonority hierarchy of neighbouring segments in the spoken chain, although a distinctive status for syllabicity vs non-syllabicity may have to be posited for pairs like French *rouille* [ruj] 'rust' vs *roui* [rwi] 'retted' or *houille* [uj] 'coal' vs *oui* [wi] 'yes'.

Three closely related Tibeto-Burman languages of Nepal[1] provide supporting evidence for conflicting arguments concerning the derived or non-derived status of syllabicity of close vocoids. Tamang confirms the sonority hierarchy as the structuring principle for the syllable, in Gurung we observe the existence of another principle superceding the sonority hierarchy, while the third language, Marphali, confirms the interpretation of the Gurung data and leads us to revise our notion of 'close' vocoids to include a variant of what is phonemically an /a/.

Tamang

An examination of the table of complex nuclei in Tamang (fig 2) shows that it is unnecessary to posit a phonological distinction between the vocalic variant and the glide variant of the two high vowels /i/ and /u/.

opening GV			opening GV:		
underlying level	*syllabified level*	*phonetic realization*	*underlying level*	*syllabified level*	*phonetic realization*
iu	ju	ju	iuː	juː	juː
io	jo	jo	ioː	joː	joː
ia	ja	ja	iaː	jaː	jaː
ua	wa	wa	uaː	waː	waː
			iuaː	jwaː	ɥaː

closing VF			opening-closing GVF		
underlying level	*syllabified level*	*phonetic realization*	*underlying level*	*syllabified level*	*phonetic realization*
ui	uj	ui~wi	iui	juj	ɥi
oi	oj	oi~oe~we	ioi	joj	joi
ai	aj	ai	iai	jaj	jai
au	aw	au	iau	jaw	jau
			uai	waj	wai

Fig.2: Complex nuclei in Risiangku Tamang (Tibeto-Burman, Nepal)

[1] Tamang, Gurung, and the language of the village of Marpha, here referred to as Marphali, belong to what Shafer (1955) termed the 'Gurung branch of the Bodish section of the Bodic division of Tibeto-Burman', a super-family comprising over 300 poorly described languages spoken in northern South Asia, southern China, and northern Southeast Asia.

Free phonetic variation is observed in a limited number of cases like [ui] or [wi] for /ui/, or the more spectacular variation [oi] [oe] or [we] for /oi/ in final position. When these are combined with suffixes in a word, a conditioned variation occurs which tends to favor an open syllable structure as much as possible. Thus the two roots /[2]pui-/ 'to carry' and /[1]moi-/ 'to plough' have the following realizations:

‘to carry’	[2]pui-pa	[[2]pwiba]	‘carry!’	[2]pui-o	[[2]pujo]
‘to plow’	[1]moi-pa	[[1]mweba]	‘plow!’	[1]moi-o	[[1]mojo]

In most cases, phonetic realization and phonological functional role coincide. Two rules account for the assignment of the segments to syllable slots at the functional level.

Rule 1: /i/ functions as a consonant in the presence of any other vowel.

Rule 2: /u/ functions as a consonant in the presence of any vowel other than /i/.

From these rules we can deduce that all the nuclei listed in the first column of the top part of fig. 2 have an open syllable structure GV, while the nuclei listed in the bottom part of the table have a closed syllable structure VF or GVF.

That this is structurally the case is evidenced by the divergent ways in which the two sets of nuclei insert themselves into the Tamang syllabic canon, which can be symbolized as (C)(L)(G)V(F), with only a single consonant allowed in final position F[2].

Complex nuclei ending in /i/, whether they be pronounced with a phonetic approximant [j] or with a phonetic vowel [i] as their last segment, do not allow a final consonant to follow them. So a word like */puit-pa/ is structurally impossible.

On the contrary, complex nuclei beginning with an /i/ and ending in a short vowel (first column of the table) allow a final consonant after them: e.g. [1]kiut-pa 'to break', [1]sial-pa 'to rinse' [4]uam-pa 'to coax'.

Long vowels in all contexts close the syllable. Since no consonant final is possible, the presence or absence of consonant finals cannot be used as a clue to the internal structure of the nuclei in the second column of the top part of the table. Since rules 1 and 2 are not contradicted they are assumed to apply.

The two rules posited for Tamang plainly support the establishment of a sonority hierarchy which strictly determines the functional role of the vocoids:

i < u < a

Gurung

Gurung, a close relative of Tamang, has a much poorer array of complex nuclei, as shown in fig. 3. Its syllable canon — C(L,G)V — is also more depleted in that it has no final consonant and — although not sufficiently apparent in the formula of the syllabic canon — many fewer possibilities of initial consonant clusters.

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[2] C = occlusive, L = liquid, G = glide, V = vowel, and F = final consonant (subsuming all types: C, L and G).

GV	GV	GGV	GV
ju	wi	jwi	-
jo	we	jwe	a̯e
ja	wa	-	a̯u

(a̯u and jwe appear in one word each)

Fig.3: Gurung nuclei do not follow the sonority hierarchy in the structuration of the syllable

Since there are no final consonants F, we cannot use their presence or absence after a complex nucleus as a clue to its internal structure, as we did in Tamang. But Glover's phonetic description of the problematic sequences in the right column of the table clearly points to a structuration of the syllable different from that of Tamang. Glover interprets those sequences as semi-vowel followed by vowel. The description of the phonemes of the language reads as follows:
"Liquids and semi-vowels: Gurung has an alveolar flap, a lateral, and three semi-vowels — palatal, bilabial and central." (Glover, 1969:21).

He transcribes these phonemes as follows : /r/ /l/ /j/ /w/ /a̲/.

Glover's analysis of vocoid sequences follows the pattern which applies elsewhere in the language, which is a syllable canon allowing only open syllables. In this analysis the postulated sonority hierarchy i<u<a has no role. The structuring principle is the following:

> **Rule 3: when two potentially vocalic segments come together, the first one becomes a glide.**

This interpretation leads us to recognize /a̲/ as a glide, phonologically (albeit as a derived phonological feature) as well as phonetically.

Phonetically Glover describes /a̲/ as “a voiced low close central unrounded vocoid” transcribed [ə] (1969:25). The timing is the same, he says, in ka̯ẽ ‘rice’, sje ‘meat’, and kwẽ ‘grandson/clothes’ (1969:27).

Functionally, this historically unstable segment has a different distribution from /j, w, r, l/ in that the latter may occur word-initially and intervocalically, while /a̲/ may not. (1969:27)

From the point of view of distinctivity alone, it is possible, if artificial and inelegant, to disregard the phonetic syllable peak on the /e/ in the /a̯e/ sequence (considering it as a low level phonetic implementation rule), and to posit an underlying diphthong /ai̯/. Considering that Gurung has lost (historically) not only final consonants but even vocalic length, this would not be very satisfactory.

Data from Marphali supports Glover's analysis, from a typological point of view, in that it precludes, in our view, adopting an interpretation of complex nuclei which would refuse the status of glide to phonetically non-syllabic /a̯/.

Marphali

In figure 4 we present the list of complex nuclei in the Marpha dialect of Thakali. In this language we note the presence of a non-syllabic non-high vowel, which I have transcribed in my field notes as [a̯], and sometimes [ɒ̯], [ɤ̯], etc. This segment can be followed by one of a set of not one, as in Gurung, but two vocoids, /i/ or /e/. If we insist on refusing to interpret [a̯] as a glide /a̯/ we can remark that /i/ has a natural semi-vocalic partner in /j/, and we could interpret, on an abstract level, /a̯i/ as /aj/. But /e/ has no more 'natural' semi-vocalic partner than /a/ does, except precisely /j/, which is already taken for /i/. Since [a̯i] and [a̯e] contrast, as can be seen from the quasi-minimal contrasts in Fig 5, this solution is not tenable.

palatal glide: ju, jo, jʌ, ja

non-palatal glides:

	"labiovelar" glide Rounding	*"pharyngeal" glide no Rounding*
1st degree	u̯i [wi]	a̯i
2nd degree	u̯e [we, o̯e, o̯i]	a̯e
3rd degree	(No *Cu̯a [*wa]) †	

†except one word : [3]mwa 'Marpha'(pronounced mɔβaŋ in neighbouring Syang)

Fig.4: Complex nuclei in Marphali

Labiovelar glide	*Pharyngeal -Uvular glide*	*No glide*
[1]ku̯i 'shade'	[4]ka̯i [~kɬ~qi] 'one'	[3]ki [~kʲi] 'you'
[4]ku̯e 'song'	[4]ka̯e 'plank'	[4]ke [~kʲe] 'work'
[2]pu̯e 'incense'	[2]pa̯e 'wool'	[3]pe [~pʲe]'wife'

Fig.5: Some quasi-minimal contrasts in Marphali

The Gurung data, and *a fortiori* the Marpha data raise a phonetic problem and a phonological problem.

A phonetic problem

At least at the level of the phonetic transcription of data, we need a phonetic symbol for an approximant partner to /a/. The IPA manual comments that "Cardinal [ɑ] is the openest of the back vowels; if the tongue were retracted further, a fricative consonant of the [ʁ] type would result" (IPA, 1949 p.4), but it does not offer an approximant symbol along that road. In the same manner as we find [j] between [i] and [ɟ] , [w] between [u] and [ʍ], and [ɯ̟] between [ɯ] and [ɣ], a symbol for 'a-approximant' between [ɑ] and [ʁ] would be welcome.

The main problem we encounter in thinking about the general question of approximants is that we are used to thinking of them only along the "vertical dimension" according to the standard vowel chart of the IPA (Fig.9 below). Catford (1977:167)

points out the difference in approach used in describing consonants and vowels in the IPA standard in the following terms:

"... in describing consonants, we refer to the location of the closest approximation between articulators; for vowels, on the other hand, we refer to the 'absolute' height of the tongue, and the location of this 'highest point' of the tongue irrespective of whether this is also the location of closest approximation."

Catford sketches this in a series of diagrams reproduced here as fig. 6.a, and 6b.

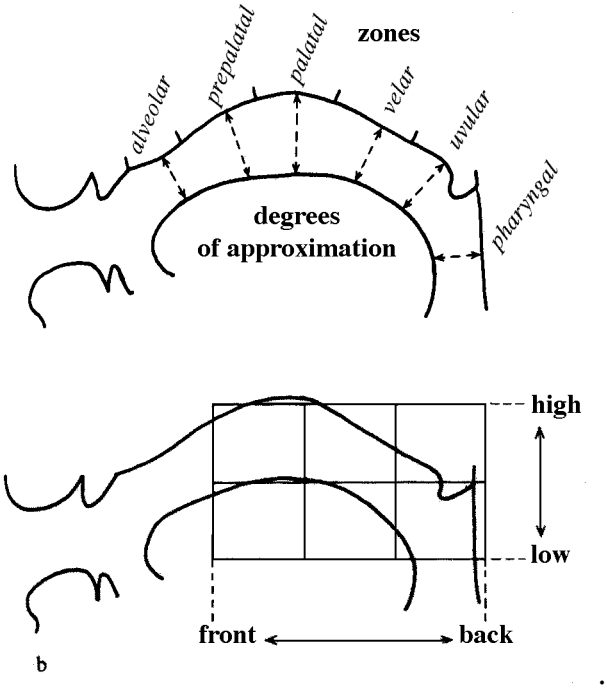

Fig. 6a: Two ways of classifying oral articulation (a) that commonly used for consonants (b) that traditionally used for vowels (after Catford, 1977:167)
[names of the zones of articulation added]

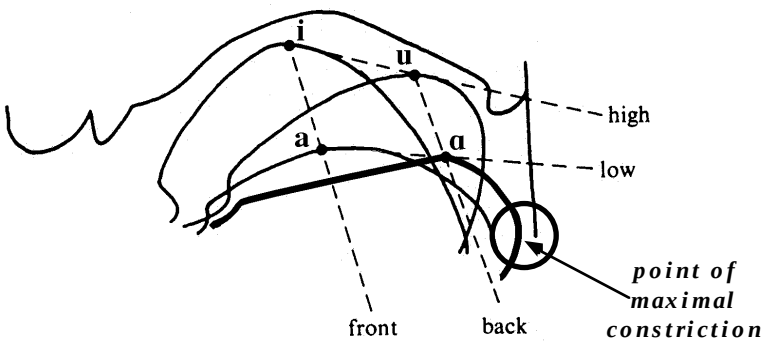

Fig. 6b: The 'highest point of the tongue' in traditional vowel classification (after Catford 1977:173) [the indication of the point of closest approximation for [ɑ] is added]

If we shift our mental image of the vocalic space from the over-abstract standard triangle or trapezoid in Fig.9, to revert to a figure closer to actual articulation as in

Abercrombie (1967:157), reproduced in fig.7a and 7b, and if we define the phoneme /a/ and the series of phonetic values from [a] to [ɑ] as 'pharyngeal' (or uvular) vowels rather than 'open' vowels, as luminously shown in Catford's "polar co-ordinate" diagram (Catford 1974:167) (reproduced as fig. 8), it becomes much easier to visualize — and accept the reality of — an a-approximant (transcribed ɑ̟ / ɐ̞ in Fig.9) which would fill one of the empty slots for a uvular or velar approximant on the received IPA chart .

Fig. 7a: The tilted oval shape of the vocoid space within which the highest point of the body of the tongue is placed in the production of vocoids (Laver 1994:272, simplified).

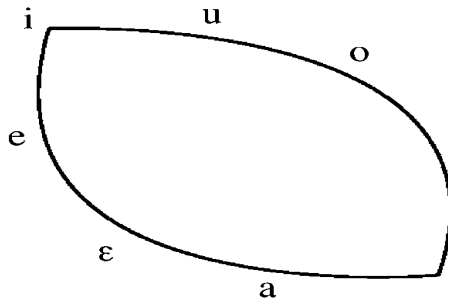

Fig. 7b: Placement of the cardinal vowels on Abercrombie's representation of the vocalic space.

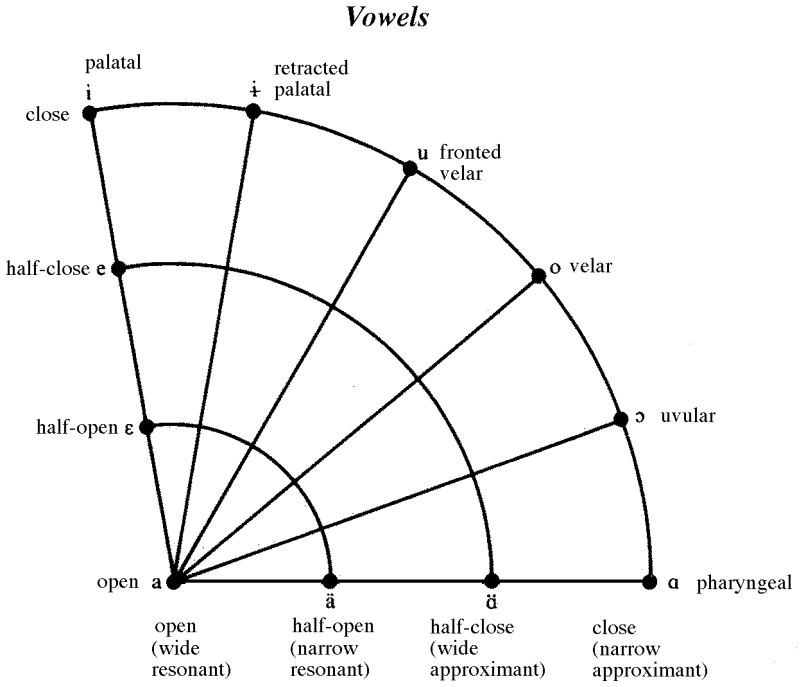

Fig. 8: Catford's polar co-ordinate vowel diagram describing vowels in terms of articulatory location and stricture-type.

The need for a symbol

From the phonological point of view as well, a symbol, parallel to /j/ and /w/, which would symbolize at the same time the segment and its function in the syllable structure, seems a useful addition to the IPA.

As in many other cases, the absence of a handy tool to describe and transcribe something reflects the absence of the corresponding concept in the theory, and as a consequence the absence of an observational strategy in the collection and description of data. Such an absence of descriptive vocabulary leads to the camouflage of the corresponding facts in the description, which, in a vicious circle, leads to the phenomenon being reported as 'rare' or 'dubious' and hence being ignored in the theory.

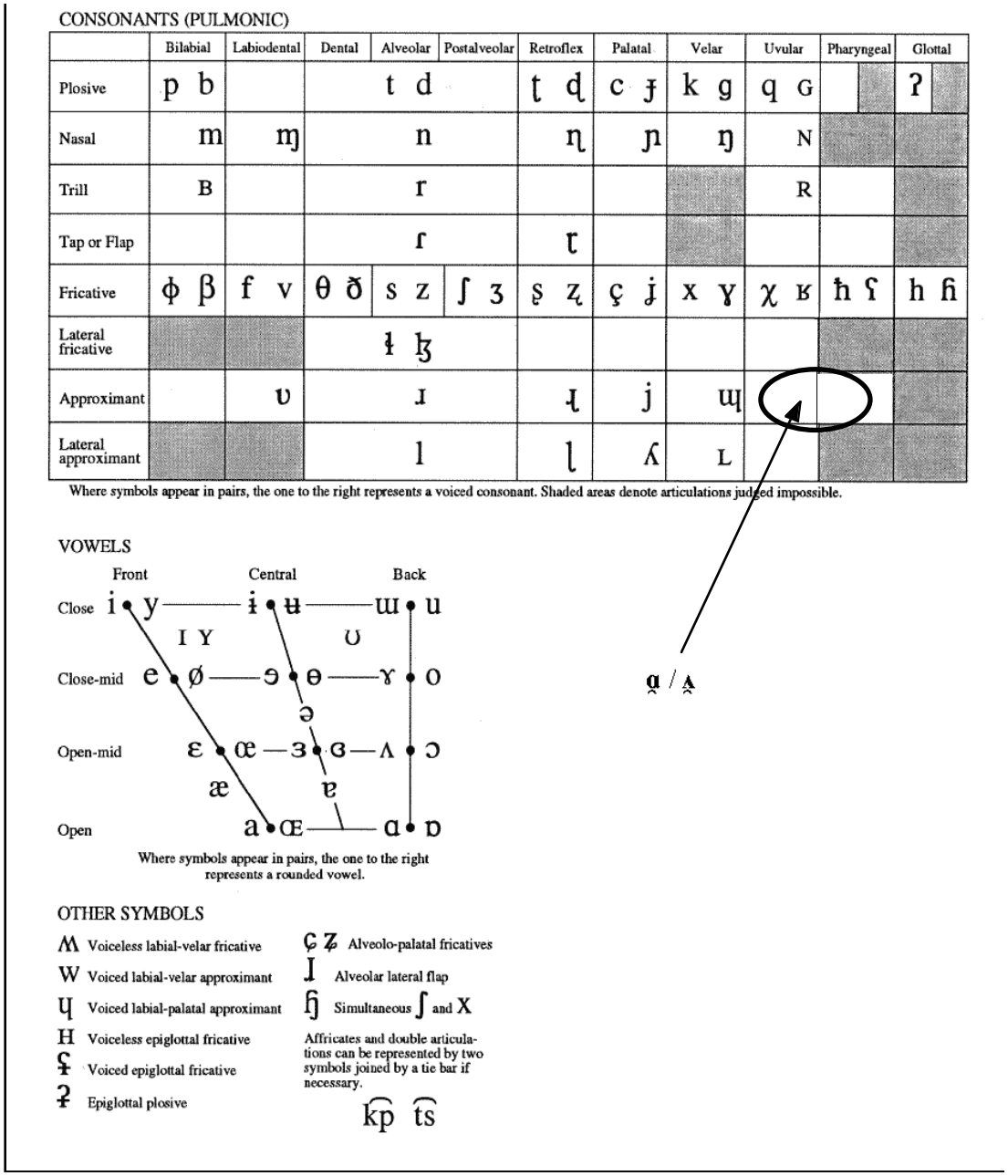

Fig. 9: Excerpt from the chart International Phonetic Alphabet (revised to 1989) with the place where an approximant symbol should be inserted

A phonological problem: the pertinence of the non-syllabic feature of /a̯/

Concerning the place of the nuclear peak in vocoid sequences, the IPA mentions that the half moon placed above a vowel — I have placed it under the vowel here— can be used to indicate the weaker member of a diphthong, (ex. aŭ) but adds that “it is not generally necessary to insert that mark”. This last statement implies that "generally" nuclear peak can be derived by general principles. (API p.17)

Vennemann proposes the idea that NUcleus is a fonction which is mostly but not entirely determined by the sonority hierarchy, and gives an example from English, (where it does not concern “normal” nucleus material, but the sequence of potentially syllabic consonants rn) (1988:5 and footnote 11):

lantern [læn.tn̩] vs apron [ei̯.prn̩]

The structure that we have described here supplies an additional argument for considering the sonority hierarchy as a matter of tendencies rather than as of absolute constraints, even for the extreme points of the continuum.

As a consequence, this also gives us an argument for recognizing, at least in some languages, the existence of syllable structuration rules, independant of this hierarchy and interacting with it, which make reference to the resulting syllable structure. In other terms we could speak of an interaction between form and substance in the determination of the final structure.

Rule 3 proposed for Gurung, can also apply to Marphali, or be expressed as rule 4, perhaps more appropriate for Marphali, with the same result.

Rule 4: build as many open syllables as possible consistent with the syllable canon C(L,G)V(F), where F is a nasal, /r/, or /l/.

Some other languages

The phonological existence of a non-syllabic partner to /a/ has been posited by a few authors. Its phonetic form up to now has been reported as zero, which makes it an unconfortably inaudible segment. The contribution of the Tibeto-Burman languages reported here is to give it phonetic reality. Comparative evidence will show this segment to be essentially weak and evanescent. It has to be captured in the process of evolution between more stable phonemes. To gather such evidence, detailed coverage of dialectal variation through extensive fieldwork is necessary.

Thus, in Mandarin Chinese, E. G. Pulleyblank proposes to establish a “low glide H (or ă)” which in Mandarin would be a phonological element consisting phonetically of “smooth vowel onset”, and be thus “inaudible as a consonantal sound distinct from the following vowel”.(Pulleyblank, 1984:17)

In Spanish, Bowen and Stockwell state that in words like *beatitud* [be̯atitúd] ‘beatitude’, *maestrita* [ma̯estrĭta] ‘little teacher’, or *poetisa* [po̯etĭsa] ‘poetess’ “each vowel in the cluster makes a separate syllable, but the first is shorter than the second and can be reduced to nonsyllabic status. In that case /e/ becomes /y/, /o/ becomes /w/ and /a/ becomes zero.” (Bowen and Stockwell, 1955:237)

In Inor, a dialect of the Gurage group (South Ethiopian Semitic), Prunet (1996) argues, on morpho-phonological grounds, that the low vowel /a/ can function as a guttural consonant.[3]

Comparative evidence : a transient element

Across languages of the same sub-group of Tibeto-Burman, we find /a̰/ corresponding diversely to /r/, /w/, occasionally /h/, or zero, occupying the same position in the syllable margin. It can also be manifested by — or result diachronically in — the backing of a velar initial into /q/ or of the vowel /i/ into /ɨ/ .

In other cases it may correspond to an /a/ functioning as the vocalic nucleus of a diphthong, or of a VF sequence likely to evolve into a diphthong.

Examples will be found in annex 1 for contrast and fluctuation within the same language, and in annex 2 for comparative evidence.

[3] Axininca Campa (Peru) and some Salish languages are also reported as likely to provide support for the definition of /a/ as a pharyngeal vowel , as well as for the phonetic and phonological reality of the corresponding uvulo-pharyngeal approximant /a̰/. (pers. comm. E.G.Pulleyblank, and J.-F. Prunet) .

Annex 1: Some words with diphthongs or complex nuclei in Gurung
(from Glover*Phonemic Summary*, comparative tonal categories added)

Some quasi-minimal sets:

[2]sje	headlice
[2]swẽ	birdfood
[2]sa̲e	price
[1]sa̲e	thing
[1]sa̲ẽ	mind
[1]swiba	to clean vegetables
[2]mwi	body hair
[3]mwe[h]	footprint
[3]mre[h]	pumpkin seeds
[1]ma̲eba	to breakdown soil
[1]ma̲ẽ ~ mwẽ	medicine

"The semi-vowels /w/ and /a/ fluctuate in a number of words in the environment /C..e/ where C is /m/ or /p/. [The informant] is quite conscious [...] of the fact that these words have alternative pronunciations. In general /w/ seems more frequent except for 'medicine'." (Glover, *1969*)

[1]ka̲e	voice
[1]ka̲ẽ	rice
[3]ka̲e[h]ba	to be late
[3]kwẽ	grandson
[4]kwe	bee/song

And some more examples:

[4]ca̲e[h]	dot on forehead
[1]ca̲eba	to stop raining
[2]ŋa̲eba	to remain as surplus
[4]ba̲ẽba	to wait
[2]kha̲ẽba	to reap
[1]pa̲e	funeral ceremony
[3]ka̲u[h]	frog

Annex 2 : Comparative data relating to the two Marphali non-palatal glides

(Some variant phonetic notations have been retained; the phonemic interpretation is that in the headings)

Marphali /u̯/

/u̯i/ [wi, ɥi] **{[+Rounding], [1st degree], [Back to Front]}**

	Marpha	Syang	Risiangku	Gurung	Tukche
ghost	[3]dwi	dɥi (ɦ)	-	-	[4]maːŋ[3]tuj
body	[3]lɥi	lɥi (ɦ)	[3]lwi	-	[3]li
exorcism figure	[1]lɥi/lwi	li[54]			
landslide	[4]ʈwi	ɖiɦ	[4]ʈwi	[4]ʈwi	[4]ʈi
ball of wool	[1]thwi	tɕi			thi pholtoŋ
shade	[1]kwi	kuː	[2]krip		
lump on neck of fowls	[2]mwi	mun	-	[2]mwi ‘fur’	*(loan)*
silver	[4]mwi	mwiɦ	[4]mwi	[4]mwi ‘money’	*(loan)*
cousin	[1]ŋwi	-	-	[2]ŋõlo	

/u̯e/ [oi, oe, o̯e, o̯ɛ]≍**{[+Rounding], [2nd degree], [Back to Front]}**

	Marpha	Syang	Risiangku	Gurung	Tukche	Praka
song	[4]koe	goi/gwɛ(ɦ)	[3]wai	[4]kwe	[4]koj	[4]khwe
rice	[2]ʃjo̯e	ʃje	[3]s(j)eːba	-	[H]sje/swe	
book	[1]tʃhjo̯ɛ	tʃhje	[1]tshjoi			
colour	[2]tsho̯e	tshɛ	[2]tshon			
incense	[2]po̯e	pwe	[2]poiraŋ			

NB: /o̯e/ is not found after a dental stop in Marpha. In Syang, the labiovelar glide disappears also after the sibilants ('book', rice', 'colour').

Marphali /ɑ̯/

/ɑ̯i/ [ɑ̯i, ɑ̯i, ɤi, i̟, ʔi]≍**{[-Rounding], [1st degree], [Back to Front] or [Back+ Front]}**

	Marpha	Syang	Risiangku	Gurung	Tukche	Praga
dirt	[3]gɤi	gi̟ (ɦ)	[1]khiti	[3]kri	-	[3]kri
one	[4]ki̟/[4]kɑ̯i	-	[4]kik	[4]gri	[4]ʈi	[4]hriː/khriː
to roll up[4]	khi̟lba/qhilba	[1]khil-pa	-	-	-	

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[4] *Note*: the pharyngeal glide can disappear after a velar initial if the initial becomes a [q].
Contrast 'roll up' (a 'pharyngeal-piece' in Firthian terms) with the following words in /ki/ [kji/k’i] (which we could term 'a palatal-piece')

	Marpha	Risiangku
to swim	k’ilba	[1]kjal-pa
to sneeze	kh’iwa	

/e̱/ [e̱, ê̱, ê̱, ê̱, ʌe, ʔɛ] **{[-Rounding], [1st degree], [Back to Front]** or **[Back+Front]}**

	Marpha	Syang	Risiangku	Gurung	Tukche	Praga
plank	[4]kê̱/[4]kê̱ɛ	-	[4]krai-[1]siŋ			
voice, language	[2]kê̱/[2]kʌe	-	[2]kat	[1]ke̱e	[H]kʌj	[2]kje
waist	[1]kê̱ɛ/[1]qê̱ɛ	kʌe	[1]ke:	[1]kre	[H]ʈe	[1]kre
basket w/ holes	[3]gê̱ɛ	gê̱i (ɦ)	[3]kai 'rack'		[4]kʌj ‘craddle’	
basket (straight)	[3]tsê̱ɛ	tso (ɦ)				
bamboo strap	[1]tshê̱ɛ/tshɛ	tshê̱ɛ	[1]tshai	[1]tshê̱e		
iron	[1]phê̱ɛ	-	[2]phai		[H]phʌj	
leftover rice	[1]ŋê̱ɛ/[1]ŋʌe	ŋʌɛ	-	[2]ŋê̱eba	ŋʌi (Gopang)	
buffalo	[2]mê̱e/[2]mʌe	-	[2]mahi			
to bite	[2]khê̱e/qhɛwa	khʌi	[1]khrap-pa			
to spin thread	[2]khê̱e/qhɛwa	khʌi	[2]khrai-pa			
to climb[5]	kê̱ɛwa/qɛwa		[1]krat-pa	[1]kre	[2]ʈe	

NB: /tʌe/ and/nʌe/ are not found in Marpha. The glide, retained in Syang, has disappeared.

	Marpha	Syang	Risiangku	Gurung	Tukche
load	[4]te	tʌɛ/[11]de*	[4]tot	[4]ti	[4]te
pilgrimage	[2]ne	nʌi	[2]ne:	-	[H]ne

** loan from the Tukche form*

Note to the table in annex 2:

Phonetic pitch of the 4 tones in the dialects quoted (in Zhao Yuen-ren's notation)

language	Tamang	----------	Thakali	---------	Gurung	Manang
village	Risiangku	Tukche	Marpha	Syang	Ghachok	Ngawal
/¹/.	54	54	43	43	33	33
/²/.	44	44/33	45	45	54	45
/³/.	33/22	11	33/22	11	11	54
/⁴/.	211	121	51	33/22	12	31

Data from Marpha, Syang, and Risiangku are from the author's fieldwork.

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[5] *Note*: the pharyngeal glide can disappear after a velar initial if the initial becomes a [q].
Contrast 'to bite' with 'work' /ke/ [kje/k’e]

	Marpha	Syang	Risiangku	Gurung	Tukche	Praga	Proto-Tamang
work	[4]ke [[4]kje]	geɦ	[4]kjat	[4]ke	[4]ke	[4]khje	*[B]gjat

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