PHONETIC DESCRIPTION AND PHONOLOGICAL FUNCTION: SOME REFLECTIONS UPON BACK UNROUNDED VOWELS IN THAI, KHMER AND VIETNAMESE

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Linguists have long been aware of the difficulties that may arise from the use of the same set of descriptive terms for phonological as well as phonetic entities. The best-known case is probably that of the labels *consonant* and *vowel*, where confusion arises when sound segments which are by any general phonetic definition vowels turn out to function like consonants in specific languages, and vice versa. That is to say, the description of a sound in general phonetic, i.e. *non*-language specific, terms may sometimes conflict with the phonological interpretation of the 'same' sound within a given language.

A clear example of this state of affairs is seen in the varying function of aspiration after voiceless stops. In languages like English it occurs regularly in certain contexts but is never contrastive and is thus treated as 'allophonic' only. In languages like Thai and Khmer on the other hand, contrasts between voiceless aspirated and unaspirated plosives, as evidenced by numerous minimal pairs, are clearly 'phonemic'. These two languages share a Sanskritic-type spelling system which represents both the aspirated and the unaspirated series by single symbols, suggesting that the members of the aspirated series are felt to be 'unitary' in the same sense as those of the unaspirated series. Although phonetic and phonemic transcriptions usually employ two roman letters for each member of the aspirated series, Thai /ph, th, kh/ are almost invariably treated as being 'monophonemic', like /p, t, k/.[1] The aspirated stops of Khmer are from the general phonetic point of view no different from those of Thai: the same general phonetic labels apply, and for the purposes of phonetic description they are the 'same' sounds as their Thai counterparts. But their phonological role is different. The occurrence in Khmer of morphologically related pairs of words, such as khoh(s) 'to be wrong', kɔ̆mhoh(s) 'fault'; thùm~thom 'big', tŭmhùm 'size'; khɤŋ 'angry', kɔ̆mhɤŋ 'anger', - alongside many parallel pairs such as krùp 'all', kŭmrùp 'to complete'; sɗɤy 'to speak', sɔ̆mɗɤy 'speech', etc., - has led linguists to treat the aspirated stops in such instances as clusters of stop + /h/ from the phonological point of view. In other contexts, e.g. before liquids, the presence or absence of aspiration after stops in Khmer is allophonic, not phonemic as it is in Thai. While Khmer initial khl is phonetically indistinguishable from Thai initial khl-, its phonological status is different. In Khmer there is no /khl/: /kl/ *contrast as in Thai; the aspiration of voiceless stops before* l *is* allophonic only.[2] Thus, considerations both of morphological patterning and of allophonic distribution have impelled linguists to recognize differences in the phonological status of aspirated stops in the two languages, and, in the case of Khmer, even within a single language.

What has perhaps not been so generally observed is the fact that similar disparities may exist between the phonetic descriptions of vowels in general terms and their phonological status in specific language systems. *This has struck me particularly in connection with the back unrounded vowels*, which are such a characteristic feature of the Tai languages and their neighbours. The close and half-close back unrounded vowels [ɯ] and [ɤ], (and sometimes the more open [ʌ] *also*), *are found* in Thai, Khmer and Vietnamese, as well as in many of the minority languages of the area, but their phonological rôles vary from language to language, and sometimes from context to context within the same language. In the rest of this paper I wish to draw attention briefly to the phonetic nature of these vowels, to the descriptive labels and symbols that have been attached to them, and to certain peculiarities in their distribution in Thai, Khmer and Vietnamese, which call for interpretation in phonological terms. I hope, moreover, that this glimpse of the varying synchronic rôles of the vowels may perhaps shed some light, however dim, upon possible conditioning factors for some of the problems of Tai diachronic phonology to which William Gedney has recently drawn our attention.[3]

The phonetic nature of the vowels

From the articulatory point of view, there is no doubt that these vowels are what the I.P.A. system of description labels as 'back unrounded'. This does not mean that they are always 'fully back', and indeed my auditory impression is that the tongue positions for Thai [ɯ] and [ɤ] are often a little further front than for [u] and [o] respectively, but nevertheless they remain 'back of centre', and are phonetically 'back' vowels rather than central ones, i.e. they are *not* like I.P.A. [ɨ] and [ə], but more retracted than these. In teaching Thai pronunciation to English-speaking students one is sometimes tempted to think that the (Southern British) English [ə:] in *turn* is acceptable for the Thai [ɤ:], but one has only to listen to beginning Thai students' attempts at British English *first term, early bird*, etc. to be forced to recognize how much more retracted the Thai vowel is.

Descriptive Labels and Symbols used

The true nature of the sounds has, I believe, often been obscured by the subtle tyranny exercised over our minds by the symbols used to represent them. Since few printers and even fewer typewriters are furnished with the official I.P.A. symbols for the back unrounded vowels, linguists have had recourse to other symbols such as ü̲, y̲ and ɨ̲ for [ɯ], *and to ö̲ and ə̲ for [ɤ], etc. What symbol is used is theoretically unimportant* provided the description is right, but in practice I have found that Thai and English students alike have sometimes been misled by them.

Further confusion may arise in the minds of students and readers in that many writers on Thai, wishing to introduce the vowel phonemes systematically and with as little fuss as possible, present them schematically in a neat and symmetrical 3-way system, as for example:-[4]

	Front	Back Unrounded	Back rounded
(Gedney)	i, ii	ɨ, ɨɨ	u, uu
	e, ee	ə, əə	o, oo
	ɛ, ɛɛ	a, aa	ɔ, ɔɔ

	Front	Back Unrounded	Back Rounded
(Noss)	i	y	u
	e	ə	o
	ɛ	a	ɔ

	Front	Central	Back
(Anthony)	i:	y:	u:
	e:	ə:	o:
	ɛ:	a:	ɔ:

	Front	Central	Back
(Abramson)	i	ɨ	u
	e	ə	o
	æ	a	ɔ

	Front Unrounded	Central	Back Rounded
(Haas)	i	y	u
	e	ə	o
	ɛ	a	ɔ
(Purnell)	i	ɨ	u
	e	ə	o
	ɛ	a	ɔ

That so many writers have labelled [ɯ] and [ɤ] as *central*, along with [a], does not, of course, necessarily mean that they believed them to be central in tongue position. More probably the writers in question were not much concerned with phonetic detail, and chose 'central' as a convenient label for vowels which are neither the familiar front unrounded nor back rounded, but something 'between the two' in some sense, i.e. spread like a front vowel, but more retracted, like a back one.

From an acoustic point of view, as Abramson's spectrograms clearly show[5], there is a very real sense in which [ɯ] and [ɤ] are 'central' or 'intermediate' between front and back. In the average formant frequency values of what Abramson writes ɨɨ and əə, F_1 is a little *higher* than that of ii, uu and ee, oo respectively, while F_2 is *lower* than that of the corresponding front vowels, ii, ee and *higher* than that of the corresponding back rounded vowels uu, oo.[6] The relationships of the formant structures of the series ii : ɨɨ :

uu and of ee : əə : oo is clearly comparable with that of the series ææ : aa : ɔɔ; in other words, ɨɨ, əə and aa are what used to be termed 'compact', as contrasted with their front and rounded back counterparts. From the acoustic point of view, [ɯ] and [ɤ] are no more closely related to [u] and [o] than they are to [i] and [e], which appears to justify some such label as 'central'. This is all to the good provided the label is *not* taken to relate to tongue position, but to acoustic quality, i.e. to the shape of the vocal tract as a whole. Unfortunately, the graphs commonly used to display the relative formant frequencies of vowels[7] are deliberately plotted in such a way as to make the results look reassuringly like the familiar vowel quadrilateral used in articulatory phonetics. I have found that students are frequently inclined to correlate a more forward position on the formant graph thus plotted with a more forward tongue position, leaving out of account the enormous acoustic importance of the rounding or spreading of the lips. In Abramson's graphs, ɨɨ and əə are centrally placed, with ɨɨ sometimes even 'closer' to ii than to uu.

By and large, what has been said above about the ways in which classificatory labels, displays, and what Gedney has called 'accidents of transcription', may mislead the unwary applies equally to Vietnamese and Khmer. There seems, however, to have been less inclination to label [ɯ] and [ɤ] as 'central' in Vietnamese, perhaps because the Vietnamese official roman orthography uses modified forms of the letters u and o for these vowels.[8] In Khmer the problem for linguists has been to find *enough* roman letters and combinations of letters to represent the great variety of vocalic variation in the language; the vowel system is too complex to allow of simple 3 x 3 schemata such as have been put forward for Thai.[9]

The distribution of unrounded back vowels in diphthongs

As is well known, there are distributional constraints in Thai upon the first element of diphthongs and triphthongs moving towards a close front or close back vowel. Only the vowel a, long and short, may form the starting point of diphthongs moving towards both i and u.[10] i, e, ɛ may move towards u, u, o, ɔ may move towards i; ɯ, ɤ may move only towards i, i.e. they behave in this respect like *back* vowels. Similarly, in the triphthongs, iə → u, uə → i, and ɯə → i. This is set out in the diagrams below. It is emphasised in view of what has been said above about the way in which schematic displays may mislead the reader that these diagrams are to be taken as convenient for the illustration of phonological function, but are not, except in a very general way, to be regarded as representing tongue positions. In teaching Thai pronunciation I use the conventional quadrilateral vowel figure, but when it comes to demonstrating the way in which such vowels are used in the formation of diphthongs I find the triangular diagram useful.[11]