

THE DEVELOPMENT OF THE REGISTERS IN STANDARD KHMER

PHILIP N. JENNER

As far as I know, the concept of register as a linguistic feature was first applied to the vowel system of modern Mon by Harry L. Shorto, Professor of Mon-Khmer Studies at the School of Oriental and African Studies, University of London. Shorto recognises a *head register* consisting of a vowel subset "characterised by clear voice quality" and a *chest register* consisting of a parallel vowel subset "characterised by breathy voice quality in association with a general laxness of the speech organs and a somewhat centralised articulation of vowels". The quasi-tonal distinction between the two subsets is "inherent in all Mon words" and "similar to that of Cambodian."¹

The first to apply the term to modern standard Khmer was Miss Eugénie J.A. Henderson, also of the School of Oriental and African Studies.² In her now classic description of Khmer phonology,³ Henderson speaks of a *First Register*, corresponding to Shorto's head register, and a *Second Register*, corresponding to Shorto's chest register. Apart from the descriptive refinements she introduces, these are coextensive with the "a-series" and "o-series" vowels recognised by François Martin⁴ as well as his predecessors and followers.⁵ However, Henderson, a product of the British school of acoustic phonetics established by Daniel Jones and an exponent of the Firthian school of linguistics, defines her First Register as marked primarily by "a 'normal' or 'head' voice quality", and secondarily by "relatively high pitch". In contrast, her Second Register is marked primarily by "a deep rather breathy or 'sepulchral' voice, pronounced with lowering of the larynx, and frequently accompanied by a certain dilation of the nostrils", and secondarily by lower pitch.⁶ While in Mon "the exponents of register are distributed throughout the articulatory complex but exclude pitch features,"⁷ in Khmer "the

register of a syllable is closely bound up with the vowel nucleus of that syllable, the two being mutually interdependent..." but includes pitch.⁸ For Henderson, then, the primary factor in register is contrastive (oral versus pharyngeal) resonance while contrastive (normal versus lower) pitch is a secondary factor. She allows that "in relation to the VN of the second register, those of the first are in general more open in quality,"⁹ but this single reference to the common lowering of her First Register is patently not part of her definition of register. She insists in fact that "the different vowel 'colour' inherent in the registers ... ensures that no vowel nucleus of the first register can ever have exactly the same quality as a vowel nucleus of the second register, no matter how alike their general description may be apart from the question of register."¹⁰

The very excellence of Henderson's interpretation of the registers, reflecting her broad knowledge of Southeast Asian linguistics, posed a curious problem for others in the field. On the one hand, the question arose of reconciling her conclusions with those of Martini, who had had nothing whatever to say of resonance and pitch contrasts.¹¹ On the other hand, when it came to applying Henderson's findings to the development of improved pedagogical methods, it was found that their concern with phonetic phenomena called for modifications. A valuable study of the first question was made by Heinz-Jürgen Pinnow, who advisedly concluded that Henderson's phonological description and Martini's Saussurian phonemic description both have undeniable merits.¹² The second and equally serious matter has been ably resolved by Mrs Judith M. Jacob, Lecturer in Cambodian at the School of Oriental and African Studies. Dispensing with Henderson's contrastive pitch, Jacob accepts contrastive resonance and introduces the feature of contrastive tenseness, which is only implicit in Henderson's description but which Shorto attributes to Mon. Jacob stipulates that syllable nuclei of the First Register are "pronounced with a clear, 'head' voice and a certain degree of tension" while those of the Second are pronounced "with a breathy, 'chest' voice and a comparatively relaxed utterance."¹³

More importantly, however, Jacob specifies that this "distinction of voice quality in the utterance of the vowels and diphthongs of the two registers" is *potential* - that is to say, facultative. "This difference of voice quality," she says, "will ... not be heard in the speech of all speakers. It may be heard occasionally [*sic*] in the speech of some speakers and is then most easily noted in syllables uttered in isolation." She rules out, moreover, any registral contrast in the three potential pairs of long high falling diphthongs which she transcribes *iə/ïə*, *ue/ûe*, *u:ə/ù:ə*, noting that the Cambodians themselves are "sometimes

confused about these diphthongs in some words, not knowing to which register they belong and therefore not knowing which spelling to use."¹⁴

Jacob's modification of Henderson's original terms bears out Pinnow's conclusion as noted above and makes it easier not only to adjust Martini's observation of functional facts to Henderson's observation of phonetic facts but also to translate Henderson's findings into other phonemic analyses. Thus the American linguist Franklin E. Huffman, a former student of Mrs Jacob, has developed a phonemic interpretation of standard Khmer which improves upon Martini's earlier system and makes no mention whatever of contrastive resonance, pitch, or tension.¹⁵ Rejecting the term "register", he returns to the older conception of "series", which however he restricts to his exposition of the writing system. Such restriction is justified in the sense that the register of any given nucleus is a lexical fact which cannot be accounted for from the data of pure description but can be accounted for in terms of the quasi-historical environments reflected in the writing system. Elsewhere I have commented on some of the strong and weak points of Huffman's analysis.¹⁶

In this place I wish only to suggest that on pedagogical as well as analytical grounds it may be preferable (a) to return to a position more midway between Shorto, Henderson and Jacob on the one hand and Martini on the other and (b) to pay closer attention to the development of the modern vowel system.

While the actual term used is probably unimportant, my own view is that the label "register" should be retained in phonemic interpretations of standard Khmer but should be redefined (despite the confusion thereby created with Firthian usage) in terms of function. After all, Henderson's and Jacob's phonetic observations have by no means been invalidated or otherwise shelved by conversion into American phonemic terms and, as Jacob points out, contrast *may* be effected by means of systematic alternations of resonance and tension, if not also of Henderson's pitch. The potentiality of more than minimal functional distinctions is hence a feature of the language with which the instructor and student of Khmer must reckon. It is this potentiality that accounts for the presence in standard Khmer of what Fries and Pike called "coexistent phonemic systems".¹⁷ On the one hand we have a *Hochsprache* or Received Pronunciation manifesting 31 contrasting nuclei and reflecting an ideal of delivery appropriate for situations in which speech is formal and largely premeditated, if not actually read or recited. On the other hand we have a parallel style of utterance, "normal" or neutral without being substandard, which manifests only 24 contrasting nuclei. Specifically, on the high, higher-mid and low levels of openness both systems have

6, 3 and 7 nuclei respectively. Above the mean-mid level, however, the Received Pronunciation has 6 nuclei (/ÿÿ, ïï, ÿæ, ùæ, èè, òò/) not found in the normal style, while below the mean-mid level it has 1 nucleus (/əə/) which the normal style lacks. One of the functions of a sound instructional method should be to explain the rationale of these coexisting systems.

For this and other reasons I maintain that the concept of register, by whatever name it is known, should not be confined to expositions of the writing system. The latter, after all, reflects a stage of the language *before* the development of the two vowel subsets in question, and whether it is fortunate for the Khmer (and us) that their writing is conservative enough to signal the interrelationships of these subsets is a moot point having little to do with linguistic analysis. The circumstance that it does show registral relationships should not be ignored, but it seems much more useful to my way of thinking to show how the registers are manifested on the phonemic level.

In the first place, the register of most of the 31 syllable nuclei is recognisable on the basis of (a) the nuclear shape itself, (b) the nature of the syllable initial, whether simple or clustered, or (c) a combination of these indices. For example, the 9 nuclei which I write /ii, ɛɛ, əə, uu, u, uə, ɔɔ, ooə, oə/ fall exclusively within the High Register (Henderson's Second), while the 8 nuclei which I write /aaɛ, aa, a, aaə, o, ao, aa, a/ fall, again exclusively, within the Low Register. This means that ambivalence is limited to the 3 pairs of "broken" nuclei mentioned above by Jacob plus the 4 pairs of simple phonemes which I write /éè : èè, ÿÿ : ÿÿ, éə : èə, óó : òò/. Among the consonants initial /m, n, ŋ, w, j, r/ presuppose High Register nuclei, while initial /b, d, q, s, h/ presuppose Low Register nuclei; ambivalence is thus confined to the four stops plus /n, l/. Hence while Henderson and Jacob mark all nuclei of the High Register with the grave accent, I prefer to add diacritics only in the 14 ambivalent cases just cited - with the deplorable innovation of reserving the grave for the Low (First) Register while using the acute for the High. Even a certain percentage¹⁸ of these diacritics is redundant, thanks to the consonant environments specified.

In the second place, the two registers are interdependent in the sense that the phonemic inventory is incomplete without both while members of each registral pair show morphophonemic alternation in the presence of certain affixes: /ruh ~ ruəh/ 'to exist, be (alive)' > /rbəh/ 'object, thing'; /rðom/ 'to surround' > /sraəom/ 'to envelop, encase'; /wíiəj/ 'to beat, whip' > /cwəaj/ 'to wind, wrap, plait'; /praəɛ/ 'to change' > /bəmɾɛɛ/ 'change'; /roəp/ 'to count' > /prap/ 'to

tell, say'; /hùuət/ 'to be dry' > /samṇúuət/ 'drought'; /kwa/ 'to be uneasy' > /kaṇwui/ 'uneasiness'.

Closer attention to the historical development of the registers would have another pedagogical result, namely that of reassigning the primacy of the registers. This may appear to be a trivial point, but heretofore it has been the Low Register that is treated as the more original vowel subset while the High Register has been relegated to a position vaguely subordinate to it. The only discernible logic in this interpretation is that the Low Register nuclei are associated with voiceless initials while the High Register nuclei are associated with voiced initials which, according to the usual scheme, follow their voiceless counterparts. In reality it is the nuclei of the High Register, with the exceptions noted below, that stand closer to the nuclei of Middle Khmer and have undergone relatively little change. The primacy of the High Register nuclei is, moreover, borne out by the circumstance that all syllables known to me with initial clusters consisting of stops belonging to different registers have High Register nuclei: phgara /pkɔr/ 'thunder', thbēka /tpeək/ 'to be bare, bald', chboḥ /cpóh/ 'toward', khjā'ka /kceək/ 'to spit out'.¹⁹

The vowel system of modern standard Khmer developed by degrees out of the far simpler system of Middle Khmer based on 9 long vowels (Table 1), which can be demonstrated fairly well from rhymes of the period. The 3 falling diphthongs may have had a short prior member but were themselves probably long in functional terms. The short counterparts of /ee/ and /εε/, shown in parentheses, can be neither proved nor disproved with existing evidence and are included mainly for symmetry's sake.

Front unrounded		Central		Back rounded	
<i>long</i>	<i>short</i>	<i>long</i>	<i>short</i>	<i>long</i>	<i>short</i>
ii	i	yy	y	uu	u
	ie		ye		ue
ee	(e)	əə	ə	oo	(o)
εε	(ε)	aa	a	ɔɔ	ɔ

Table 1: The Vowel System of Middle Khmer

To all appearances, the Middle Khmer period was a time of rapid phonological development. One can only conclude that this development, reinforced and perhaps even accelerated by a multiplication of contacts with Mon, Cham, Thai and Vietnamese, was a form of readjustment to new conditions created by the gradual devoicing of the voiced stops of Old Khmer. In her doctoral dissertation my colleague Mme Saveros Lewitz registered surprising success in dating this devoicing process by exploiting data embedded in toponyms as transcribed by Portuguese and Spanish travellers of the 16th century and later. Acknowledging that devoicing set in probably early in our era and lasted many centuries, Mme Lewitz concludes that the changes in question seem to have reached completion between the 16th and 18th centuries.²⁰

As contrast was lost in Old Khmer or early Middle Khmer between such minimal pairs as gava *[gəw] and kava *[kəw] or dūra *[duur] and tūra *[tuur], compensatory changes took place which maintained the old contrasts in new ways. What part resonance, tension and pitch differences played we are in no position to say, but these changes culminated in the emergence of two parallel vowel subsets: one reflecting the nuclei of syllables with originally voiced initials and showing little modification of the Middle Khmer vowel system, the other reflecting the nuclei of syllables with originally voiceless initials and developing out of the first by several types of increased openness.

Seeing that one term, *register*, has already been taken over from music, it may be permissible to adopt one more. Metaphorically, the intervals of openness from high to higher-mid, from higher-mid to lower-mid, and higher-mid from lower-mid to low may be called intervals of one *tone*; on this basis the intervals from high to lower-high, lower-high to higher-mid, and so forth may be called *semitones*, while smaller intervals can be known as *microtones*. These fine distinctions of tongue-height were one of two mechanisms by which the old contrasts were replaced, the other being the generation of onglides of several types.

Table 2 shows the emergent vowel system of a purely hypothetical early modern stage which may be helpful in following the changes from the Middle Khmer system to that of the present-day standard.

In the *front unrounded nuclei*, the Low Register counterpart of Middle Khmer /ii/ (which, being already high, remains the same) develops by a lowering of the latter by one tone. A precarious contrast is created by lowering the Middle Khmer /ee/ by a microtone, probably with microtonic raising of the tongue in the new High Register. More dramatically, the Low Register counterpart of Middle Khmer /es/ (which may undergo raising from the higher-low to the lower-mid level) comes into being by development of a low onglide. The Middle Khmer /i/, whose contrast with

/ii/ was probably already accentuated by semitonic lowering to lower-high [i] and by incipient centralisation, may have yielded a correspondingly lower and more central /e/ in the emergent Low Register.

Front unrounded				Central				Back rounded			
<i>long</i>		<i>short</i>		<i>long</i>		<i>short</i>		<i>long</i>		<i>short</i>	
<i>HR</i>	<i>LR</i>	<i>HR</i>	<i>LR</i>	<i>HR</i>	<i>LR</i>	<i>HR</i>	<i>LR</i>	<i>HR</i>	<i>LR</i>	<i>HR</i>	<i>LR</i>
ii	ee	i ^v	e ^v	yy	yy ^v	y	y ^v	uu	oo	u ^v	o ^v
		iə ~ iə				yə ~ yə				ue ~ ue	
ee	ee ^v	(e)	(e ^v)	əə	aəə	ə	ə ^v	oo	aoo	(o)	(o ^v)
εε	aεε	(ε)	(ε ^v)					ɔɔ	aa	ɔ	ɑ
				e ^e aa		e ^e a	a				
				o ^o aa	aa	o ^o a	a				

Table 2: The Vowel System of Early Modern Khmer

In the central nuclei, a Low Register counterpart of Middle Khmer /yy/ is manifested only by microtonic lowering. On the mid level, however, the Low Register counterpart of /əə/ appears with the acquisition of a low onglide, while the new High Register nucleus, possibly on the mean-mid level formerly, may be raised by one microtone to reinforce the contrast. On the low level, the process is reversed: Middle Khmer /aa/, already low, can go no lower; it consequently serves as the new Low Register nucleus, while contrast is introduced by generation of a *high* onglide before it in the new High Register nucleus. Depending on the dialect, this onglide is front [e] or back [o], both probably mean-mid. This circumstance seems to proceed from the variable articulation of Middle Khmer /aa/ which, though generally central, must have ranged between fairly front (where it tended to blend into /εε/) and fairly back (where it tended to blend into /ɔɔ/). The same method of introducing new contrasts to replace the old is also used in the case of short /a/, which serves as the new Low Register nucleus while the same mean-mid onglides are generated before it for the new High Register. As in the case of the front vowels, Middle Khmer /y/ may have been a semitone or microtone lower than /yy/; unable to be raised without weakening its contrast with /yy/, it maintains its original level while its equivalent in the new Low Register is manifested by further lowering, nearly to the mean-mid level where contrast between it and the microtonically raised form of Middle Khmer /ə/ blends into it. The Low Register counterpart of the latter may be on the lower-mid level.

In the back rounded nuclei, the Low Register development of Middle Khmer /uu/ is manifested by dropping a full tone to the higher-mid level; that of Middle Khmer /oo/ acquires a low onglide. In both cases the new High Register nucleus is unchanged. The Middle Khmer /ɔɔ/, which may like /εε/ have been on the higher-lower level originally, is raised to lower-mid for the new High Register but is dropped to the low level for the new Low Register. Among the short nuclei, Middle Khmer /u/ was most likely on the lower-high level along with /i/ and /y/, at which point it remains for the HR, being dropped to mean-mid level for the new Low Register. A Middle Khmer /o/, shown in parentheses on Table 1, may have occurred before /-h/; by the time of our early modern Khmer it had probably been absorbed by raising into /u/ while its Low Register counterpart, /ɔ/, was also probably lost at an early date by falling together with /a/. As can be seen, the development of Middle Khmer /ɔ/ runs parallel to its long counterpart.

The 3 falling diphthongs of Middle Khmer probably underwent no change apart from a potentiality of microtonic lowering for the Low Register.

Table 3, finally, shows the vowel system of modern standard Khmer arranged by registral pairs. Two general developments may be noted first:

1. With early modern /_aεε, _aεə, _aoo/ the peak of sonority shifts back to the onglide, which thereby becomes long and stressed, leaving the original element short and unstressed: /aaε, aaə, aao/.

2. With early modern /iə : iə, yə : yə, uə : uə/ the prior elements acquire length and establish their capacity to pattern with initials of either voiceless or voiced nature: /fiə : fiə, ɣyə : ɣyə, úuə : úuə/. Eventually contrast is lost between the new /fiə/ and early modern /^eaa/, which first undergoes the same shift as /_aεε, _aεə, _aoo/ and becomes /eeə/ (still heard in some of the nonstandard dialects) and is then raised to /fiə/. On the other hand, contrast is introduced between the new /úuə/ and the new /uə/ allophone of short /u/; be it noted, incidentally, that this /uə/ may well reflect the Middle Khmer /uə/ of ambiguous length. The rare /ooə/ nucleus, which is not in allophonic relationship with /fiə/ but is a functionally distinct diphthong, was not raised along with /eeə/. The short counterparts of /fiə, ooə/, which were /^ea, ^oa/ in the early modern stage, shift their peak of sonority and become /eə, oə/ and undergo no further change.

We may now turn to examine the less general changes shown in Table 3.

In the front unrounded nuclei, the Low Register counterpart of /ii/, namely /əə(j)/, has been considerably centralised. The /j/ element, on the synchronic level, is the self-closure this nucleus develops in the absence of another final: pī /pəəj/ 'wind instrument', trī /trəəj/

Front unrounded				Central				Back rounded			
long		short		long		short		long		short	
HR	LR	HR	LR	HR	LR	HR	LR	HR	LR	HR	LR
ii	əə(j)	i	è	ýγ	(ýγ)	-	-	uu	òo	u~ ue	o
íie	ìie	-	-	ýγə	ýγə	-	-	úue	ùue	-	-
ée	èe	-	-	éə	aaə	-	-	óo	aaó	-	-
εε	aaε	-	-	-	-	-	-	-	-	-	-
íie	aa	eə	a	-	-	-	-	oo	aa	u~ ue	a
ooə		oə									

Table 3: The Registral Pairs of Modern Standard Khmer

'fish', $ch\bar{i}$ / $ch\bar{e}əj$ / 'to eat', $kt\bar{i}$ / $kd\bar{e}əj$ / 'substance', $sr\bar{i}$ / $sr\bar{e}əj$ / 'female'. However, this / j / is hard to account for unless we postulate an independent development from Middle Khmer / ii / parallel to the development of / $aaε$, $aaə$, $aaó$ /, namely the generation of a low front onglide which eventually took to itself the peak of sonority and moved toward a more central point of articulation. It may be mentioned in this connection that the nucleus / $əə$ / with other finals is uncommon in modern Khmer. The pair / $ée$: $èe$ / normally shows no registral distinction except before /-h/,²¹ while in the Received Pronunciation its members contrast as [i] and [e] respectively. The central position of / aa , a / in the early modern period seems to be demonstrated both by the fact that they acquired back as well as front onglides and by the fact that certain dialects (e.g. Sisaket and Surin) show a front onglide before / aa / and a central (in reality, back unrounded) onglide before / a /: $m\bar{a}na$ / $m\bar{i}en$ / 'to exist' = Sisaket / $m\bar{i}en$ /, $m\bar{a}'na$ / $moən$ / 'fowl' = Surin / $myən$ /. At all events / aa , a / now advance from central to front, though the long nucleus continues to have considerable horizontal variability, to reinforce their contrast with / aa , a /. Among the short nuclei, / i / is centralised to the point of blending into / $ý$ /,²² while its Low Register counterpart, likewise centralised, either remains on the mean-mid level or drops slightly.

In the central nuclei, apart from the fronting of / aa , a / and their High Register counterparts, little change occurs other than a loss of length contrasts: / $ý$ /, as has just been said, is absorbed into / i /; / $ý$ / merges with / $è$ /, and early modern / e^{\wedge} : e^{\vee} / appear as environmentally

determined allophones of their long counterparts. The Low Register /ỳγ/, incidentally, is a doubtful nucleus but may occur in a few syllables.

In the back rounded nuclei, the long nuclei undergo little modification. Among the short nuclei, the early modern /o : ɔ/ appear as environmentally determined allophones of their long counterparts, while the /ɔ/ of Middle Khmer and the early modern period no longer provides contrast with /a/ only a semitone below and is drastically raised to lower-high /u ~ uə/, where it blends with /u/ (represented by u) on the one hand and /óo/ (represented by o) on the other. This latter nucleus, incidentally, is not seldom raised to [o:] in the Received Pronunciation while the Low Register /òo/, with which it is not historically related, frequently drops to the mean-mid level. This reinforced contrast parallels that of /ée : èe/ in the front nuclei.

It can be seen from the foregoing that each Middle Khmer syllable nucleus has yielded two (paired) nuclei in modern standard Khmer in such a way that the vowel system of the latter is divisible into two matching subsets (Tables 1 and 3). In general, these subsets came into being by (1) retention of the Middle Khmer inventory with relatively little modification and (2) development of a parallel inventory by three types of increase in aperture, namely (a) lowering of the pre-modern nuclei by intervals of one semitone or less, (b) lowering by intervals of three or four semitones, and (c) generation of low onglides embracing intervals of from three to five semitones. This general direction of change was perforce reversed in the case of three low vowels, specifically Middle Khmer /aa, a, ɔ/; these served as points of departure for modern Low Register /aa, a, ɑ/, and out of them appeared new High Register reflexes by generation of high onglides in the case of /íie ~ ooé, ee ~ oé/ and by radical closure in the case of /u ~ uə/. Just as the lowering of the shortened nuclei (/i, è, u, uə, o/) seems to have been an original secondary feature reinforcing contrast with their long counterparts, so the further lowering of Low Register /èe, òo/ and the further raising of High Register /ée, óo/ may be explained as a widening or accentuation of the contrastive interval between them.

In the modern standard, potential registral contrasts involving intervals of less than one tone are seven in number: /ée : èe/ appear to be a little over a semitone apart, /ée : èe/ and /óo : òo/ are about a semitone apart, while /ỳγ : ỳγ/, /íie : íie/, /ỳγə : ỳγə/ and /úue : úue/ are at most only a microtone apart. Inasmuch as their resonance, tension or pitch contrasts may not be manifested, these slight intervals are the only stable feature distinguishing the members of these seven pairs. Predictably, it is precisely among these pairs that registral

contrast is most often lost. It is the presence or absence of contrast in these cases that differentiates the Received Pronunciation from the neutral or normal style of utterance. Experiments which I carried out in 1966 with various informants suggest that native perception of contrast between the members of these seven pairs is proportionate to the intervals between them: in my data, /éè : èè/ were distinguished with nearly 100% accuracy, /ée : èè/ and /óó : òò/ were distinguished with about 70% accuracy, members of the four other pairs with about 55% accuracy. These percentages are valueless in themselves, being almost certainly raised either by recognition of the forms used in my tests or by pure guesswork, and it is more than likely that Jacob is correct in maintaining that registral distinctions are inoperative in the case of /fiè : ìiè, ýye : ÿye, úue : ùue/.

NOTES

1. H.L. Short, *A Dictionary of Modern Spoken Mon* (London: Oxford University Press, 1962), x.
2. Eugénie J.A. Henderson, "The Phonology of Loanwords in Some South-East Asian Languages", in *Transactions of the Philological Society of Great Britain*, 1951: 146 and note 1, where the author still refers to the "head" and "chest" registers.
3. Eugénie J.A. Henderson, "The Main Features of Cambodian Pronunciation", in *BSOAS*, XIV (1952). 1:149-74.
4. F. Martini, "Aperçu phonologique du cambodgien", in *BSLP*, 42 (1942-1945). 1:112-31; see especially 129 and 131.
5. See, for example, Georges Maspero, *Grammaire de la langue khmère (cambodgien)* (Paris: Imprimerie Nationale, 1915), 49 (section 39), 79 (section 83), and *passim*; Gaston Cambefort, *Introduction au cambodgien* (Paris: G.P. Maisonneuve, 1950), 20-30; Tiw-011, *Le cambodgien sans maître* (Phnom-Penh: Variya, 1957), 6.
6. Henderson, "Main Features", 151.
7. Shorto, *loc. cit.*
8. Henderson, "Main Features", 151.
9. *ibid.*, 159.
10. *ibid.*, 155.
11. Martini, *op. cit.*
12. Heinz-Jürgen Pinnow, "Sprachgeschichtliche Erwägungen zum Phonemsystem des Khmer", in *ZPAS*, 10 (1957). 4:378-91.

13. Judith M. Jacob, *Introduction to Cambodian* (London: Oxford University Press, 1968), 4.
14. *idem.*
15. Franklin E. Huffman, *Modern Spoken Cambodian* (New Haven and London: Yale University Press, 1970), 3-8; Franklin E. Huffman, *Cambodian System of Writing and Beginning Reader, with Drills and Glossary* (New Haven and London: Yale University Press, 1970), 8-11, 15-20, 24-34, 43-6.
16. See my review of Huffman's two volumes in *JAOS*, 92 (1972).4: 556-8.
17. Charles C. Fries and Kenneth L. Pike, "Coexistent Phonemic Systems", in *Lg.*, 25 (1949). 1:29-50.
18. No definite percentage can be assigned because the frequency of initials and other components of the syllable has not been reliably calculated yet.
19. This phenomenon has been expressed as an orthographical rule: if both members of an initial cluster are stops which pattern individually with nuclei of different registers, the post-initial is dominant, i.e. determines the register. The main point here is that, to the best of my knowledge, the post-initial never corresponds to an originally voiceless stop. The significance of this may be more easily understood if I mention that the reading of syllables with initial clusters is not at all difficult. If both members of the cluster pattern individually with nuclei of the same register, the syllable nucleus belongs to that register: *mrāma* /mr̄iəm/ 'finger', *lmama* /lm̄ɔm/ 'enough', *s'āta* /sqaat/ 'to be clean', *spēka* /sbaæk/ 'hide, skin'. Conflict arises only when the members pattern individually with opposing registers, inasmuch as one member must be dominant. In this case the rule is simple: originally voiced stops are dominant over spirants (both of which are voiceless); originally voiceless stops and spirants are dominant over liquids, semivowels and nasals (all but two of which function as voiced).
20. See Saveros Lewitz, "La toponymie khmère", in *BEFEO*, LIII (1967). 2:387-8.
21. The fit of the writing system is by no means perfect; the fact remains that a phonemic transcription destined for instructional use should incorporate as many compromises with the writing system as may be useful. The *visarga* is used to represent final /h/, part of the time

before phonemically shortened nuclei, part of the time before nuclei having no shortened counterparts in the modern vowel system. -ih /-ih ~ -əh/ and -uh /-uh ~ -oh/ pose no problem, but note -ah (for -āh) /-eəh ~ -ah/. My solution, effective for pedagogical purposes, is to accept shortened allophones of the other four graphemes with which the *visarga* occurs and to arbitrarily abbreviate their phonemic transcription: -eh /-éh/ [-ɤh] ~ /-əh/ [-ɛh], -ēh /-eh/ [-ɛh] ~ /-aəh/ [-ɛh], -æh /-éh/ [-ɤh] ~ /-aəh/ [-ɤh], -oh /-óh/ [-oh ~ -oəh] ~ /-aoh/ [-oh]. The front and back nuclei in this environment are exemplified by neḥ /néh/ [nɪh] 'this' : noḥ /nóh/ [noh] 'that', pūḥḥeḥ /ponnəh/ [pon'neḥ] 'as much as this' : pōḥḥoḥ /ponnaoh/ [pon'noh] 'as much as that', raleḥ /rléh/ [r^ɔlɪh] ~ ralēḥ /rlɛh/ [r^ɔlɛh] 'to drop' : broḥ /próh/ [proəh] 'cause', khmeḥ /kməh/ [kʰmɛh] 'vinegar' : koḥ /kaoh/ [koh] 'island'. The main point to be borne in mind is that what was originally a low on-glide is lost entirely when /aə, aə, aə/ occur before /-h/ and that the abbreviated transcriptions /ə, ə, ə/ represent the graphemes used.

22. What is meant here is that functional contrast between [ɪ] and [u], both of which continue to be heard, cannot be demonstrated from actual discourse in the Received Pronunciation.