

THE VALUE OF AU AND AI IN MIDDLE KHMER

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The years from the abandonment of Angkor in 1431 down through the eighteenth century were a time of radical phonological, morphological and syntactic changes which formed the transition from late Old Khmer to early modern Khmer. The phonological changes in question affected the consonant system and the vowel system alike. The chief development in the consonantism was the devoicing of the old voiced stops while that in the vocalism was the generation, out of the original inventory, of two parallel subsets of syllable nuclei now generally known as the "registers". Describing the various changes which took place and fixing their order in time is an enterprise which no one has yet attempted, presumably because of the absence of a reliable method or of evidence recognisable as such. While the historical development of Khmer is still only very imperfectly understood, it now appears that at least some of the changes that occurred, together with their sequence, are discoverable from Middle Khmer metrical texts.

The purpose of the present paper is to suggest that the graphemes au and ai had the value in pre-modern Khmer (before the development of the registers) of /əw/ [ɣw] and /əj/ [ɣj], respectively, rather than the commonly assumed /aw/ [aw] and /aj/ [aj]. Because this claim is likely to run counter to the views of most Cambodian and other scholars who consider the matter, these two symbols provide a particularly welcome opportunity for me to describe the evidence and the method of analysis on which my conclusion is based.

As a preface to what follows it may be mentioned that the modern view of au and ai as representing original /aw/ and /aj/ apparently arises from the precedence assigned to the Low Register (LR) generally¹ and, in

particular, from the circumstance that the "natural" register² of syllable nuclei following initial /q/ [ʔ ~ Ø] is low. Initial 'ī and 'ū, for example, are read as LR /qəej/ and /qəow/. The corresponding High Register (HR) readings, being "unnatural", require use of the *thāsabda*, a diacritic functioning as the diaeresis: 'ī̄ /qii/, 'ū̄ /quu/. Similarly, the natural readings of 'ē and 'o are LR /qaæ/ and /qaa/, not HR /qee/ and /qoo/. The HR and LR readings of au and ai are, respectively, /św ~ śj/ and /aw ~ aj/. The thesis here, therefore, is that the Middle Khmer value of au and ai was virtually the same as that of the modern HR.

The question of what values of au and ai were introduced into Cambodia from India and Ceylon, while by no means irrelevant, is unanswerable in the present state of our knowledge. The modern writing system is known to have developed from a prototype attributable to the early *grantha* systems in use under the Pallava kings of Kañcī (Coromandel coast) and brought into Fu-nan by the second century A.D. However, the problem is decidedly complex. Among other things, we have only inferential knowledge regarding the phonology of Sanskrit as it was current in Cambodian territory. For the time being, we know nothing of the constancy of brahmanic literary control over this Cambodian Sanskrit. We can only guess at the conditions surrounding the adaptation of the writing system, previously used only for Sanskrit, to Khmer.³ Knowing next to nothing of the phonology of the Pāli introduced into Cambodia around the fourteenth century,⁴ we cannot even surmise whether this confirmed or conflicted with the Sanskrit tradition. We are in no position to assess possible Dravidian influence in the establishment of written Khmer. The parallels with Sino-Japanese are striking.

The data base from which the present analysis is made consists of 5164 rhymes from eighteen Middle Khmer metrical texts. Seventeen of the latter belong to the *cpā'pa* /cbap/ genre, comprising short homiletic works, while the eighteenth is the *Grande inscription d'Angkor Vat* (IMA 38).⁵ The *cpā'pa* are undated texts but have been placed in chronological sequence on the basis of the phonological divergence from modern Khmer revealed in their rhymes; IMA 38, a longer devotional text, is dated in correspondence with A.D. 1702 or 1701, and the same chronological analysis places it immediately after the five earliest *cpā'pa*. Most of the relevant information on Middle Khmer au and ai is shown on the accompanying tables.

Table 1 shows the number of au rhymes and ai rhymes⁶ in relation to the total number of rhymes in each text. As can be seen, there are 153 au rhymes and 154 ai rhymes, representing 2.96% and 2.98% of the total respectively. In addition to indicating the relatively small segment of

the corpus with which we are concerned here, the table shows the absence of any plausible correlation of the frequency of rhymes in each text with the age of the texts in which they occur. While it is undeniable that *au* rhymes are lacking in the *Cpā'pa krama*, one of the earliest works, and reach peak frequencies in the later *Kūna cau lpæka* (B) (7.09%), the *Ariyasatthā* (6.70%), the *Bākya cā'sa* (6.19%) and the *Dūnmāna kūna* (5.98%), the overall frequency profile (which averages 3.32%) is so erratic as to preclude any connection with the date of the texts. Such a view is confirmed by the pattern of *ai* rhymes: these have an average frequency of 2.71% and shows peaks descending from the late *Cpā'pa hai mahājana* (II) (6.17%) to the earlier IMA 38 (5.88%) and the even earlier *Kūna cau* (5.49%). At least for this group of texts, therefore, it may be supposed that the incidence of *au* rhymes and *ai* rhymes is fortuitous and dependent only on the needs and talents of the successive poets.

	TOTAL RHYMES	au RHYMES		ai RHYMES	
<i>Ker(tti) kāla</i>	105	1	0.95%	1	2.86%
<i>Kūna cau</i>	328	15	4.57%	18	5.49%
<i>Rājaneti</i>	214	10	4.67%	4	1.87%
<i>Krama</i>	154	0	-	8	5.19%
<i>Hai mahājana</i> (I)	337	8	2.37%	13	3.86%
IMA 38	493	2	0.41%	29	5.88%
<i>Kūna cau lpæka</i> (A)	297	8	2.69%	0	-
<i>Vidhūrapandita</i>	225	7	3.11%	9	4.00%
<i>Pantām pitā</i>	295	8	2.71%	0	-
<i>Kūna cau lpæka</i> (B)	127	9	7.09%	0	-
<i>Trīneti</i>	380	7	1.84%	14	3.68%
<i>Dūnmāna khḷwna</i>	175	6	3.43%	9	5.14%
<i>Bākya cā'sa</i>	97	6	6.19%	0	-
<i>Hai mahājana</i> (II)	324	7	2.16%	20	6.17%
<i>Pantām 'ū buka</i>	291	8	2.75%	0	-
<i>Dūnmāna kūna</i>	251	15	5.98%	4	1.59%
<i>Srī</i>	579	14	2.42%	13	2.25%
<i>Prusa</i>	298	9	3.02%	9	3.02%
' <i>Ariyasatthā</i>	194	13	6.70%	1	0.52%
	5164	153	2.96%	154	2.98%

TABLE 1: GENERAL FREQUENCIES

In weighing these *au* and *ai* rhymes as evidence and sifting the usable from the unusable it is convenient to distinguish "perfect" and "im-

perfect" rhymes. Perfect au and ai rhymes are those in which both members of a rhyming pair show graphic au or ai in their relevant syllables. Imperfect au and ai rhymes are those in which only one member shows graphic au or ai, which rhymes with some other orthographic form. Examples of both classes of rhyme will be given presently. The perfect rhymes in our group of texts represent 66.8% of all au and ai rhymes, imperfect rhymes accounting for the remaining 33.2%.

Table 2 shows that perfect au rhymes number 118 (77.1% of all au rhymes) while perfect ai rhymes number 88 (57.1% of all ai rhymes). Perfect au rhymes, mirroring the frequencies given in Table 1, rise and fall at random. With an average frequency of 2.59%, they show maxima in the case of the *Kūna cau lṣeka* (B), the *Bākya cā'sa*, the *Rājaneti*, the *Kūna cau*, and the *Dūnmāna kūna*; minima are registered for the *Krama*, IMA 38, the *Ker(ti) kāla*, the *Trīneti*, and the *Hai mahājana* (II).

	TOTAL RHYMES	au RHYMES		ai RHYMES	
<i>Ker(ti) kāla</i>	105	1		2	1.90%
<i>Kūna cau</i>	328	15	4.57%	10	3.05%
<i>Rājaneti</i>	214	10	4.67%	1	0.47%
<i>Krama</i>	154	0	-	4	2.60%
<i>Hai mahājana</i> (I)	337	6	1.78%	3	0.89%
IMA 38	493	0	-	25	5.07%
<i>Kūna cau lṣeka</i> (A)	297	6	2.02%	0	-
<i>Vidhūrapaṇḍita</i>	225	7	3.11%	8	3.56%
<i>Paṇṭām pitā</i>	295	6	2.03%	0	-
<i>Kūna cau lṣeka</i> (B)	127	7	5.51%	0	-
<i>Trīneti</i>	380	5	1.32%	9	2.37%
<i>Dūnmāna khlwna</i>	175	5	2.86%	6	3.43%
<i>Bākya cā'sa</i>	97	5	5.15%	0	-
<i>Hai mahājana</i>	324	5	1.54%	6	1.85%
<i>Paṇṭām 'ū buka</i>	291	6	2.06%	0	-
<i>Dūnmāna kūna</i>	251	9	3.59%	0	-
<i>Srī</i>	579	10	1.73%	6	1.04%
<i>Prusa</i>	298	8	2.68%	7	2.35%
<i>'Ariyasatthā</i>	194	7	3.61%	1	0.52%
	5164	118	2.26%	88	1.53%

TABLE 2: FREQUENCY OF "PERFECT" RHYMES

Perfect ai rhymes, though more independent of the frequencies given in Table 1, are no less erratic. With an average frequency of 1.52%, they

show peaks for IMA 38, the *Vidhūrapaṇḍita*, the *Ḍūnmāna khlwna*, and the *Kūna cau*, but drop to zero for six texts. The absence of perceptible increase or decrease in these frequencies shows again that the incidence of perfect rhymes is dictated by the chance needs and abilities of the poets and cannot be correlated with the age or modernity of the texts.

Table 3 shows that imperfect au rhymes number 35 (22.9% of all au rhymes) while imperfect ai rhymes number 67 (43.5% of all ai rhymes). Inasmuch as these are a function of perfect rhymes, what has already been said regarding the fortuitous nature of the latter is equally applicable to them.

	TOTAL RHYMES	au RHYMES		ai RHYMES	
<i>Ker{ti} kāla</i>	105	0	-	1	0.95%
<i>Kūna cau</i>	328	0	-	8	2.44%
<i>Rājaneti</i>	214	0	-	3	1.40%
<i>Krama</i>	154	0	-	4	2.60%
<i>Hai mahājana</i> (I)	337	2	0.59%	10	2.97%
IMA 38	493	2	0.41%	4	0.81%
<i>Kūna cau lpøka</i> (A)	297	2	0.67%	0	-
<i>Vidhūrapaṇḍita</i>	225	0	-	1	0.44%
<i>Paṅtām pitā</i>	295	2	0.68%	0	-
<i>Kūna cau lpøka</i> (B)	127	2	1.57%	0	-
<i>Tṛṇeti</i>	380	2	0.53%	5	1.32%
<i>Ḍūnmāna khlwna</i>	175	1	0.57%	3	1.71%
<i>Bākya cā'sa</i>	97	1	1.03%	0	-
<i>Hai mahājana</i> (II)	324	2	0.62%	14	4.32%
<i>Paṅtām 'ū buka</i>	291	2	0.69%	0	-
<i>Ḍūnmāna kūna</i>	251	6	2.39%	4	1.59%
<i>Srī</i>	579	4	0.69%	7	1.21%
<i>Prusa</i>	298	1	0.34%	2	0.67%
<i>'Aniyasatthā</i>	194	6	3.09%	0	-
	5164	35	0.73%	66	1.18%

TABLE 3: FREQUENCY OF "IMPERFECT" RHYMES

Having defined the range of our corpus as precisely as seems warranted, we may turn now to examine its value.

Since the phonological value of au and ai is unknown in Middle Khmer but known in modern Khmer, it is permissible to propose that the perfect rhymes in our texts are divisible into three types according as their

members have HR or LR reflexes in modern Khmer. In one type, both members of the rhyme presuppose HR reflexes, e.g. nau /nəw/ : dau /təw/ (KC 16ce) and brai /prəj/ : nai /nəj/ (V 67d/68b).⁷ In a second type, both members of the rhyme presuppose LR reflexes, e.g. smau /smaw/ : phau /phaw/ (R 36ab) and thlai /tlaj/ : kraï /kraj/ (IMA 5bc). It can be seen readily enough that neither of these types of rhymes furnishes evidence of an earlier value of au and ai. In the third type of rhyme one member is reflected by a HR form while the other is reflected by a LR form, e.g. ʔau /daw/ : dau /təw/ (KCLB 13d/14b), nau /nəw/ : praʔau /pradaw/ (KK 1bc) and prabai /prapəj/ : thhài /təj/ (KC 5lef), kraï /kraj/ : vai /wəj/ (R 50ce). It is clear that rhymes of this type are no less silent regarding the pre-modern value of au and ai. It can hence be said that perfect rhymes have nothing to contribute to a solution of the problem.

This means that such evidence as we have must come from imperfect rhymes.

Imperfect au rhymes (Table 4) number 35 items and have an average frequency of only 0.73%. These consist of rhymes in which one member has orthographic au or a pre-modern variant while the other member has ūva or a variant in the relevant syllable. These are so few as to be worth listing in full. With the exception of the two rhymes in IMA 38, forms are cited in the modern orthography for the reason given above. To help the reader's understanding of what is involved, the order of the rhyming members is inverted whenever necessary so that HR members stand first.

HMI	83ab	nau /nəw/	: trūva /trəw/
	94ab	dau /təw/	: trūva /trəw/
IMA	31ab	dova /təw/	: nau /nəw/
	138ab	do /təw/	: no /nəw/
KCLA	47g/48c	nau /nəw/	: cūva /cəw/
	48fe	dau /təw/	: ra'ūva /rəw/
PP	47g/48c	nau /nəw/	: cūva /cəw/
	48fe	dau /təw/	: ra'ūva /rəw/
KCLB	14bc	dau /təw/	: 'āsrūva /qaasrəw/
	36b/35d	dau /təw/	: trūva /trəw/
T	53g/54c	nau /nəw/	: phlūva /pləw/
	64ed	nau /nəw/	: kūva /kəw/
DKh	52ba	'ambau /qampəw/	: srūva /srəw/
B	13bc	dau /təw/	: 'āsrūva /qaasrəw/

	TOTAL RHYMES	FORM	ITEMS	FREQUENCY
<i>Ker(ti) kāla</i>	105	-	0	-
<i>Kūna cau</i>	328	-	0	-
<i>Rājaneti</i>	214	-	0	-
<i>Krama</i>	154	-	0	-
<i>Hai mahājana (I)</i>	337	-ūva	2	0.59%
<i>IMA 38</i>	493	-ova -o	1 1	0.20% 0.20%
<i>Kūna cau lpæka (A)</i>	297	-ūva	2	0.67%
<i>Vidhūrapandita</i>	225	-	0	-
<i>Pantām pitā</i>	295	-ūva	2	0.68%
<i>Kūna cau lpæka (B)</i>	127	-ūva	2	1.57%
<i>Trīneti</i>	380	-ūva	2	0.53%
<i>Dūnmāna khlwna</i>	175	-ūva	1	0.57%
<i>Bākya cā'sa</i>	97	-ūva	1	1.03%
<i>Hai mahājana (II)</i>	324	-ūva	2	0.62%
<i>Pantām 'ū buka</i>	291	-ūva	2	0.68%
<i>Dūnmāna kūna</i>	251	-ūva	6	2.39%
<i>Snī</i>	579	-ūva	4	0.69%
<i>Prusa</i>	298	-ūva	1	0.34%
<i>'Ariyasatthā</i>	194	-ūva	6	3.09%
	5164		35	0.73%

TABLE 4: FREQUENCY OF "IMPERFECT" au RHYMES

HMII	41d/42b	nau /nēw/	: phiūva /piðow/
	42cb	nau /nēw/	: phiūva /piðow/
PUB	47g/48c	nau /nēw/	: cēcūva /caæcðow/
	48fe	dau /tēw/	: ra'ūva /rəðow/
DKn	22c/23a	praḷau /praðaw/	: trūva /trðow/
	23ba	bau /pēw/	: trūva /trðow/
	38a	dau /tēw/	: trūva /trðow/
	39a/38c	nau /nēw/	: satrūva /satrðow/
	39ab	nau /nēw/	: mūva /mðow/
	92a/91c	bau /pēw/	: trūva /trðow/
S	118c/119a	dau /tēw/	: phiūva /piðow/
	119ba	dau /tēw/	: phiūva /piðow/
	145c/146a	dau /tēw/	: kūva /kðow/
	224c/225a	dau /tēw/	: trūva /trðow/

P	83ab	dau /tśw/	:	trūva /tròow/
A	6g/7c	bhau /phśw/	:	nūva /nśw/
	7fe	dau /tśw/	:	phiūva /piòow/
	9ec	dau /tśw/	:	sñūva /sɲòow/
	12ce	jrau /crśw/	:	'iɬūva /qəəjìòow/
	20ba	nau /nśw/	:	'ū /qòow/
	40ab	dau /tśw/	:	'iɬūva /qəəjìòow/

At first glance one is struck by the monotony of these rhymes. For example, *dau /tśw/* 'to go' occurs 19 times, *nau /nśw/* 'to be in or at' 13 times, *trūva /tròow/* 'ought, must' 9 times, and *phiūva /piòow/* 7 times. Closer examination, however, reveals a pattern which is less than monotonous: all but four of the above rhymes oppose a HR member to a LR member. Both of the rhymes in IMA 38 have a HR member opposed to another HR member. The first rhyme in the *Dūnmāna kūna* (22c/23a) has a LR member opposed to another HR member. The first rhyme in the *Dūnmāna kūna* (22c/23a) has a LR member opposed to another LR member. The first rhyme in the *'Ariyasatthā* (6g/7c) again has a HR member opposed to another HR member. We shall return to these exceptions shortly. The fact of immediate importance is that 31 out of the 35 rhymes in question (88.6%) have a HR member with graphic *au* opposed to a LR member with graphic *ūva*.

In interpreting these rhymes and applying them to the problem of determining the pre-modern value of *au*, we have at our disposition four main types of evidence: (a) conclusions to be drawn from the orthography itself, (b) such historical information as we possess, (c) conclusions resulting from comparison of *ūva* rhymes not involving graphic *au*, and (d) conclusions resulting from comparison of *au* rhymes involving *ūva*.

From all we know of Indic writing systems (including the Khmer) and the languages they represent, it seems reasonable to suppose that prior to the emergence of the registers the grapheme *au* had one of, at most, four possible values: [aw], [ɤw], [ow] or [o(:)]. The last of these is dismissed from further consideration both because Khmer has had an /oo/ represented by orthographic *o* at all of its known stages and because a marked tendency to close this phoneme with the labial semivowel in otherwise open syllables is seen to be operative in Middle Khmer and modern Khmer. Hence if *au* ever represented [o(:)], the latter probably blended at an early date into [ow] or [ɤw], which differ only in degree of lip-rounding and, at least in the light of modern Khmer speech habits, would also be likely to fall together. Our options may therefore be narrowed down to [aw] and [ɤw ~ ow].

The same tendency toward diphthongisation is seen at work in the case

of ūva. On the basis of all we know, it is hard to believe that this grapheme ever represented [uw]. The majority of modern orthographic forms in -ūva correspond to Old Khmer forms in -ū, not seldom written -u but lengthened in open syllables. For example, modern srūva /srōw/ 'unhusked rice' reflects Old Khmer srū ~ sru /sruu/ [sru: ~ sruw]; modern phlūva /pīōw/ 'way, path, road' appears in Old Khmer as phlū ~ plū ~ plu /pluu/ [pʰlu: ~ pʰluw]; modern 'īṭūva /qəəjīōw/ 'now' appears as Old Khmer 'īlū /qīlūu/ [(?)i:lū: ~ (?)i:lūw]. However, it is during the Old Khmer period that we begin to encounter, side by side with these orthographic forms in -ū, such forms as srūv, plūv, 'ilūv for the items just cited. It seems likely that this addition of -v (now -va) to the earlier forms reflects an increasing awareness of diphthongisation in the syllable nucleus, which by this period must have begun to undergo perceptible unrounding and become [uw]. While the graphic form phlū, for example, can be interpreted as [pʰlu: ~ pʰluw], plūv can be interpreted as [pʰluw]. It may in fact have been this new phonetic shape that constituted the point of departure for the development of the modern LR ū into [ɤw] /ōw/ by regular lowering of the vowel element.⁸ Be this as it may, it is not without reason that all but one of the 31 ūva items listed above are reflected by LR forms in modern Khmer. Table 4, moreover, shows fairly clearly that the frequency of these -au : -ūva rhymes increases toward the present. In the four earliest texts no such rhymes are found at all; after a slow start frequencies rise, albeit irregularly, and reach a peak with the most recent text. This can only mean that as the -ūva forms in question moved from [uw] to [ɤw] they became increasingly suited to the rhyme in question, namely with -au forms. The single exception in the 31 ūva items, alluded to above, is the form nūva occurring in the 'Ariyasatthā (7c). This orthographic shape would normally represent */nu(w) / [nu: ~ nuw]; this particular item, however, is interpreted by Khmer scholars as pronounced nau /nəw/ [nɤw];⁹ this is tantamount to saying that it is equivalent to LR *ṇūva /nōw/ [nɤw].

The case of nūva accounts for one of the four exceptions to the pattern of registrational contrast noted above in connection with our 35 au rhymes. In the *Dūnmāna kūna* (22c/23a) we have the rhyme praṇau : trūva, of which both members presuppose LR forms in modern Khmer. When this rhyme is compared with the other imperfect rhymes in the same text, all five of which are reflected in a HR : LR opposition, we can only conclude that praṇau rhymed with bau, dau and nau at the time this relatively late work was composed. From this detail it can be inferred that by the date of this text the grapheme ūva represented a syllable nucleus which had been lowered from earlier [uw] to its modern LR level of [ɤw], whereas au had not yet been lowered to its modern LR level of [aw] but was still

at its earlier level of [ɣw]. For if au represented an original [aw] from which the modern HR [ɣw] developed by increased closure the five other rhymes in this same text would have been impossible: nau and satrūva (39a/38c), for example, could have rhymed only if both contained the nucleus [ɣw].

The remaining exceptions to the pattern of registral contrast are the two rhymes found in IMA 38, both members of which correspond to modern HR forms. The two rhymes are the same, notwithstanding their orthographic difference: modern dau and nau. The use of o for au is not surprising in view of what has already been said of the diphthongisation of the former; this is shown clearly by the fact that dova is also written do. In view of the evidence from the other texts, earlier as well as later, the conclusion is inescapable that o(va) had rounded and unrounded allophones: [ow ~ ɣw].

Our texts include 217 rhymes (4.2% of the total) based on graphic ū, including ūva. These show an average frequency of 4.24% and frequencies for each text which, as would be expected, rule out any chronological correlation: maxima are registered for the *Dānmana kūna*, the *'Ariyasatthā*, the *Kūna cau lpæka* (A), the *Pañtām 'ū buka*, the *Pañtām pitā* and the *Ker(tī) kāla*, in that order, and these are plainly fortuitous. Like rhymes with graphic au, those in ū fall into three main groups according as their members are reflected by modern HR or LR forms. One group, comprising 45 rhymes (20.7%), has both members of each rhyme corresponding to HR forms; these are exemplified by yūra /juur/ : gūra /kuur/ (KK 2d/3b) and grū /kruu/ : 'abhirū(ha) /qaphiruu/ (A 32ab). Another group, comprising 78 rhymes (35.9%), has both members of each rhyme corresponding to LR forms; these are exemplified by paripūrṇa /barəbōor/ : pramūla /pramōol/ (KC 33ef) and sūnya /sōon/ : ṭūna /dōon/ (P 71d/72b). In the third group, comprising 94 rhymes (43.3%), one member has a HR reflex while the other has a LR reflex; these are exemplified by madhūra /mathuur/ : cūla /cōol/ (R 48g/49c) and yūra /juur/ : sampūrṇa /sambōor/ (S 216ab). In examining such orthographic forms it cannot be seriously doubted that all rhymed by virtue of a common [u:], from which the modern LR reflexes developed by a general lowering affecting all but those nuclei which were already on the low level of openness.

Included in our 217 ū rhymes are the 33 -au : -ūva rhymes already discussed; it has already been noted that, with the exception of the anomalous nūva occurring in the *'Ariyasatthā* (7c), all of these forms in -ūva correspond to modern LR forms. What has not been mentioned is that orthographic ūva is found in rhyme not only with itself but also with ū. In -ūva : -ūva rhymes, 32 in number, both members of each rhyme correspond without exception to modern LR forms; these are exemplified by

skūva : 'āsrūva (IMA 93ab), trūva : tamrūva (T 80ab), and cēcūva : ra'ūva (PUB 48ce). It may be mentioned that these rhymes, showing an average frequency of 0.51%, are unevenly distributed through our texts: not found at all in the *Ker(tī) kāla*, the *Vidhūrapaṇḍita*, the *Kūna cau lpæka* (B), the *Dūnmāna khlwna*, the *Bākya cā'sa*, the *Dūnmāna kūna* or the *Prusa*, they reach a peak frequency of 2.11% in the *Trāneti*. In -ū : -ūva rhymes, 12 in number, the graphic form with ū is reflected by HR while that with ūva corresponds to LR; the single exception is the rhyme 'ū : 'āsrūva (P 9ab), where 'ū (modern /qəow/) is the graphic equivalent of LR 'ūva. These are exemplified by byū(ha) : trūva (PP 8g/9c) and trājū : raṭūva (KK 35b/34d). Rhymes of this type show an average frequency of only 0.29%; not found at all in ten of our texts, they register peak frequencies of 1.90% and 0.91% in the two earliest texts, the *Ker(tī) kāla* and the *Kūna cau*. This dovetails nicely with what was said above in connection with Table 4 and the increasing frequencies of -au : -ūva rhymes as we progress toward the modern period.

Adding our 32 -ūva : -ūva rhymes and 12 -ū : -ūva rhymes to the 33 -au : -ūva rhymes discussed previously, we obtain a total of 77 rhymes which include the grapheme ūva. Of these all but one, or 98.7%, are reflected by modern LR forms. That -ū : -ūva rhymes in the earliest texts were based on [u: ~ uw] in both members is to be inferred both from their orthography and from the presence of loanwords in some of them. For example, the rhyme trājū : raṭūva (KK 35b/34d) consists of a loan through Malay from Persian tarāzū 'balance, scales' and a loan from Sanskrit ṛtu 'fixed time, season'. To suppose that these two forms did not have a common syllable nucleus at the date of composition or that trājū : phīūva (KK 35bc) did not rhyme, merely because their modern reflexes do not rhyme, would be unwarranted. Nevertheless, with the gradual development of the registers during the Middle Khmer period and the emergence of a LR [ɣw] contrasting with a HR [u: ~ uw], these -ū : -ūva rhymes became increasingly dissonant. It is not surprising that after the *Cpā'pa kūna cau* they have only minimal incidence and do not occur at all in nine of the later texts under study. Indeed, the occurrence of grū : saṅkūva in such a late text as the *Cpā'pa sṛl* (134a/133c) is surprising, and suggests not so much deliberate archaizing on the part of the poet as borrowing from earlier texts. This very process can be seen in operation in the case of byū(ha) : trūva, which occurs first in the *Kūna cau lpæka* (A) (8g/9c), again in the *Paṅtām pitā* (8g/9c), and again in the *Paṅtām 'ū buka* (9c/8g). After the *cpā'pa cā'sa* or four oldest texts we see, as in Table 4, a gradual displacement of the grapheme ūva into rhyme with au and the eclipse of ū : ūva rhymes. The circumstance that the new -au : -ūva rhymes increase from earlier

to later texts is a direct reflection of the emergence of a LR.

	TOTAL RHYMES	AMBIVALENT RHYMES		EVIDENTIAL RHYMES		
<i>Ker(tī) kāla</i>	105	-āya	1 0.57%			
<i>Kūna cau</i>	328	-āya	8 2.44%			
<i>Rājaneti</i>	214	-āya	2 0.93%	-ī	1 0.47%	
<i>Krama</i>	154	-āya	4 2.60%			
<i>Hai mahājana' (I)</i>	337	-āya	5 1.49%	-ī	5 1.49%	
<i>IMA 38</i>	493			-ī	2 0.41%	
				-iya	1 0.20%	
				-āya	1 0.20%	
<i>Vidhūrapaṇḍita</i>	225	-āya	1 0.44%			
<i>Trīneti</i>	380	-āya	3 0.79%	-eyya	2 0.53%	
<i>Dūnmāna khlwna</i>	175	-āya	1 0.57%	-ī	2 1.14%	
<i>Hai mahājana (II)</i>	324	-āya	7 2.16%	-ī	7 2.16%	
<i>Dūnmāna kūna</i>	251	-āya	1 0.40%	-ī	2 0.80%	
				-iya	1 0.40%	
<i>Srī</i>	579	-āya	2 0.35%	-ī	5 0.86%	
<i>Prusa</i>	298	-āya	1 0.34%	-ī	1 0.34%	
	5164		36 0.72%		30 0.47%	

TABLE 5: FREQUENCY OF "IMPERFECT" ai RHYMES*

*No imperfect ai rhymes are registered for the *Kūna cau* *lpoeka* (A and B), the *Bākya cā'sa*, the *Paṅtāṅ 'ū buka*, and the *'Ariyasatthā*.

Turning now to consider the grapheme ai, we find that imperfect ai rhymes (Table 5) are divisible into two types according to the orthographic shape of their non-ai members. One type includes rhymes in which one member has ai while the other has āya¹⁰ in the modern regularised orthography. Our texts contain 36 -ai : -āya rhymes, which have an average frequency of 0.72%. The other type includes rhymes in which one member has ai while the other has a grapheme other than ai or āya. Our texts contain 30 rhymes of this type, which show an average frequency of 0.47%. Since the value of āya is exactly the same as that of ai, rhymes which include it are ambivalent and must be reinterpreted as perfect rhymes divisible into three types according as their āya members have HR or LR reflexes in modern Khmer. In one type, both members of the rhyme presuppose HR reflexes, e.g. dai /táj/ : vināya /wináj/ (KC 50g/51c) and bai(ra) /páj/ : bhāya /pháj/ (HMII 80cb). In a second type, both members of the rhyme presuppose LR reflexes, e.g. thnai /tṇaj/ : biniscāya /piniscaj/ (KK 31b) and ʔai /daj/ : 'āsrāya /qaasraj/ (V 31b/30d). In

the third type one member is reflected by a HR form while the other is reflected by a LR form, e.g. brai /préj/ : visāya /wisaj/ (KC 65fe) and nai /néj/ : prasrāya /prasraj/ (HMI 70cb) or thñai /tñaj/ : haṛdāya /harýtéj/ (K 11ce) and trai /traj/ : vināya /winéj/ (HMI 75ba). None of these three types of rhyme is capable of throwing light on the earlier value of ai. Yet it is not without interest that their 36 ai members are divided equally, in terms of the present, between HR and LR while their 36 āya members include only 9 HR items (25%) but 27 LR items (75%). Thus there are 6 HR : HR rhymes, 15 LR : LR rhymes, 15 HR : LR rhymes or LR : HR rhymes.

The remaining 30 rhymes (Table 5) are evidential. Not found in ten texts ranging from the earliest to the latest, these register peak frequencies for the *Cpā'pa hai mahājana* (II), the *Hai mahājana* (I), the *Dūnmāna khhlwna* and the IMA and show no discernible increase or decrease with the date of the texts. Rhymes of this group have one member with orthographic ai and the other member with ī in 25 cases (80.7%), with iya and eyya in two cases each, and with āya (*sic*) in one case. As was done with imperfect au rhymes, -ai : -ī rhymes are here listed in full, the original order being inverted whenever need be so that the ai members stand first.

R	lled	samcai /samcaj/	: srī /srèej/
HMI	19ab	nai /néj/	: srī /srèej/
	24ab	brai /préj/	: ktī /kdèej/
	37b/36d	vai /wéj/	: ktī /kdèej/
	50cb	nai /néj/	: ktī /kdèej/
	66cb	thlai /tlaj/	: smāratī /smaardèej/
IMA	6dc	traiya /traj/	: śrī /srèej/
	25b/24d	didaiya /tiitéj/	: śrī /srèej/
DKh	4cb	nai /néj/	: khcī /kcèej/
	38bc	dai /téj/	: smāratī /smaardèej/
HMI	4b/3d	krai /kraaj/	: srī /srèej/
	4cd	phdai /ptéj/	: thmī /tmèej/
	6bc	dai /téj/	: srī /srèej/
	52d/53b	cañrai /cañraj/	: jinasrī /cineesrèej/
	80cd	bai ra /péj/	: praṇī /pranèej/
	82ba	nai /néj/	: praṇī /pranèej/
	84bc	dai /téj/	: smāratī /smaardèej/
DKn	9cb	prabai /prapéj/	: ṭī /dèej/
	86ba	kansai /kansaj/	: metrī /méetrèej/

S	9ba	nai /nəj/	:	səŋt̄ /səmdəj/
	22ba	ʃadai /daatəj/	:	pt̄ /pdəj/
	59c/60a	nai /nəj/	:	p̄ /bəj/
	114a	cañrai /caŋraj/	:	p̄ /bəj/
	149a	krai /kraj/	:	p̄ /bəj/
P	96bc	mai /məj/	:	kt̄ /kdəj/

Without going into a full analysis, it can be said that orthographic \bar{i} represented [i:] in Middle Khmer but that with the development of the registers this value bifurcated into the modern HR /ii/ [i:] and the modern LR /əj/ [ɤj]. As has been described elsewhere, this latter nucleus presupposes an intermediate value consisting of the original [i:] preceded by a mid-level, typically front onglide: [_ei: > e:i > ɤj]. In any case \bar{i} : \bar{i} rhymes are divisible into the same three types as other nuclei. One type consists of rhymes of which both members are reflected by HR forms (which therefore show no phonological change), e.g. dharaŋt̄ /dhəɔrəni/ > thəɔrəni/ : ɾdhd̄ /ɾytdhi/ > ɾytdhi/ (HMI 75bc) and pañj̄t̄ /ʔbənʃii/ > bənʃii/ : ʃt̄ /sii/ (A 5g/6c). Another type consists of rhymes both members of which are reflected by LR forms (which do show phonological change), e.g. p̄ /ʔbi/ > bəj/ : sr̄ /sri/ > srəj/ (KK 5ab) and metr̄ /meetri/ > məetrəj/ : sraŋt̄ /sɾəʔdi/ > sɾəʔdi/ (HMII 87cd). The third type consists of rhymes of which one member is reflected by a HR form, the other by a LR form, e.g. dhūit̄ /dhuulii/ > thuulii/ : ʃt̄ /ʔdi/ > dəj/ (KK 18bc) and p̄ait̄ /ʔbaalii/ > baaləj/ : gamb̄ra /gəmbiir > kumpiir/ (HMI 8cd).

Examination of our 25 ai : \bar{i} rhymes shows that the \bar{i} member is in all cases reflected by a LR form. It is reasonable to conclude that the value [i:] is not in question in these rhymes but that [ɤj] is. On the other hand, examination also shows that the ai members break down into 8 items corresponding to LR forms (e.g. səmcaɪ, thlaɪ, traiya) and 17 items corresponding to HR forms (e.g. nai, brai, vai). From the fact that we find ai members presupposing different registers in rhyme with \bar{i} members presupposing only the LR we can only infer that the LR reflex of Middle Khmer /ii/ (\bar{i}) had developed before registral contrast was established for Middle Khmer /əj/ (ai). It is also clear that if ai originally represented [aj] these 25 rhymes would not have been possible.

Our two imperfect ai rhymes with iya are didaiya (modern dīdai) /tiitəj/ : dhibvatiya (modern adhipati) /thipdəj/ (IMA 25bc) and 'ai /qaj/ : lokiya /lɔkəj/ (DKn 76a/75c). These only confirm what has just been said of ai : \bar{i} rhymes, final -iya being no more than an

allograph of $-i$. The two $ai : eyya$ rhymes are $nai /n\acute{e}j/ : \tilde{n}eyya /n\acute{e}ej/$ (T 11ef) and $thlai /t\acute{l}aj/ : \tilde{n}eyya /n\acute{e}ej/$ (T 19ce). Here $\tilde{n}eyya$ is to nai and $thlai$ as English *love* is to *drove*, and it is not without reason that the rhyme with $thlai$ is made to continue on to $\tilde{n}eyya : ha\bar{r}d\ddot{a}ya$ (T 19ef).

The other imperfect ai rhyme is of doubtful value, since it fills an "optional" position in the meter. This is $nai /n\acute{e}j/ : sr\bar{a}ya /sraaj/$ (IMA 145ed), which almost certainly does not involve a misapprehension of the original orthography given here. This, in any case, is the sole datum in the corpus suggesting that ai may have been [aj] at any period before the development of the LR.

Internal evidence, then, shows fairly convincingly that au and ai were [ɜw] and [ɜj] in Middle Khmer and not [aw] and [aj]. As a by-product of the analysis we uncover grounds for supposing that the LR reflexes of \bar{u} and \bar{i} developed before the LR reflexes of au and ai . The first of these conclusions conforms with the pattern of development of the modern vowel system as a whole. The second corroborates what has been said regarding the gradual manifestation of registral contrasts in the language.

NOTES

1. I refer to this matter in "The Development of the Registers in Standard Khmer", in this volume.
2. "Natural" register is that which conforms to the general pattern: originally voiced consonants presuppose HR, originally voiceless consonants presuppose LR.
3. The earliest dated monument of Khmer is an inscription (K.557 and K.600) dated in correspondence with 611 A.D.
4. The earliest Pāli text from Cambodia is an inscription (K.759) dated in correspondence with 1308 A.D.
5. The corpus is the same as that which was developed for my "The Relative Dating of Some Khmer Cpā'pa", to appear in *Austroasiatic Studies*. Oceanic Linguistics Special Publications, No. 13 (Honolulu: The University Press of Hawaii, 1974).
6. By au rhymes and ai rhymes I mean rhymes in which figures at least one orthographic form of which the main syllable contains the grapheme au or ai. It is not necessary for both members of the rhyming pair to have the same grapheme.
7. Since this paper is concerned exclusively with a phonological problem, no glosses are furnished for the forms cited. The latter are given first in an Indianist transliteration of the Khmer character, then in a phonemic transcription. For fourteen syllable nuclei of modern Khmer, the acute (´) accent marks HR, the grave (`) accent marks LR. Since the analysis uses data known in the present to solve an historical problem, the transliteration reflects the modern standardised orthography with the exception of forms found in IMA 38, the text of which is available

only in a transcription of the original orthography. In this paper I write [ɣw] and [ɣj] for what I have elsewhere written [ɣ:w] and [ɣ:j], inasmuch as the accompanying phonemic forms rule out any misapprehension. Although the length of the nuclei represented by au and ai is not at issue, it must be mentioned that the traditional view is that both are short, contrasting with -āva /-aaw/ and -āya /-aaɟ/. While I respect this view in my phonemic transcription, nearly all of the rhymes adduced here suggest that it is no longer tenable.

8. This possibility conflicts with the interpretation advanced in "The Development of the Registers", according to which LR ū /ðow/ [ɣw] developed from *[_əu:] by generation of a lower onglide before original /uu/ and in parallel with LR ī /əəɟ/ [ɣj], from *[_əi:] by generation of a lower onglide before original /ii/.

9. *Vacanānukrama khmēra* (Phnom-Penh: Institut Bouddhique, 1968), I: 519a.

10. The tilde corresponds to the *saṃyogasaññā*, a diacritic borrowed from Thai to mark certain unpredictable vowel qualities.

